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ERRATUM.

"Milk in India," by Major R. J. Blackham, on page 188, in the average column, the percentage should read, 5·98 instead of 1·98.

ERRATA.

In the ROYAL ARMY MEDICAL CORPS JOURNAL for April, 1911, page 457, third line from the bottom, "Dr. S. F. Harman" should read "Dr S. F Harmer, F R S."

In the article, "Incineration in India," by Captain P S Lelean, page 517, line 12, for 1 per cent. read 0·1 per cent.

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Original Communications.

TABLE JELLIES.

BY MAJOR W. W. O. BEVERIDGE, D.S.O.
Royal Army Medical Corps.

IN the Service the use of table jellies is practically confined to the hospitals. In peace there does not seem to be a large consumption, for on inquiry at two Military Hospitals I found in the one case that the expenditure amounted to one pint for every 124 diets, and in the other one for every 140 diets, per annum. Out of 315 pints of jelly expended at one hospital in a year, 113 were packet and 102 were bottled jellies.

Generally in war time a larger quantity is required, but much will depend upon the nature of the prevailing sickness. In the South African War a very large quantity of bottled jellies was used, especially for cases of enteric fever.

As a rule jellies appear to be prescribed for no definite purpose other than that they offer a welcome change in convalescence, and are more or less pleasing to the palate. Important as these properties are, jellies have a certain real though limited function in health and disease. In the first place, gelatine itself is a protein sparer, greater even than the fats or carbo-hydrates. T. R. Merlin (*Amer. Journ. Physiol.* 1907, 285-313) states, "that besides its protein-sparing properties, the power to utilise gelatine depends also on the protein condition of the organism at the start; the lower the condition the more strongly does the organism lay claim to gelatine as a means of protecting its living substance." A person in a state

of low nitrogenous equilibrium is more in a condition to assimilate gelatine. Gelatine is also easy of digestion in the stomach and has the power of fixing any excess of acidity. Again, jellies contain a large amount of sugar, which is a true food, and the whole combination gives rise to considerable heat and energy. It is therefore not at all necessary to wait for early convalescence before giving jellies in most disorders.

The forms in which jellies can be obtained are :—

Bottled jellies.

In solid cakes or tablets.

As granulated powder.

Freshly prepared from calves' feet.

Meat jellies, such as chicken jelly.

As a general rule it is quite unusual that manufactured jellies are the product of the calf's foot. There appears to be a prevalent idea that jelly made from calf's foot is superior to that obtained from other sources. There may be some foundation for this in the fact that jelly made from calf's foot contains nearly always some native protein, that is, albumin and globulin.

There is, I think, no question that tryptophane, one of the aromatic group, is frequently present, and also traces of the phenol compounds, as shown by the reactions obtained with glyoxylic acid and Millon's reagent. The results of some experiments carried out at the Hygenic Research Laboratory will bear this out. Samples of jelly made from calf's foot according to directions obtained from a well-recognised cookery book, and of pure gold label gelatine and of granulated jelly powder were tested side by side for some of the protein colour reactions. The gelatine of the two latter samples was obtained from sources other than calf's foot.

Nature of test	Calf's foot jelly	Gelatine obtained from granulated jelly	Pure gelatine, gold label
The xantho-proteic reaction ..	Slight	Slight	Slight.
Millon's reagent	Marked ..	Very slight ..	Very Slight.
Glyoxylic acid	Slight	*Nil*	*Nil.*
Biuret test	Present ..	Present ..	Present.

The gelatine in the samples was approximately of the same amount.

Beyond this addition of true proteins gelatine made from whatever source is chemically and physiologically the same. To the manufacturers the expense of using calves' feet alone is greater than that of collagen obtained from bones, hides, and other sources.

To make one pint of jelly one calf's foot is required, at a general cost for the gelatine alone of fivepence or sixpence, whereas a similar amount made with pure gelatine costs about threepence halfpenny for the same quantity fully prepared.

Bottled jellies represent the fully-prepared article requiring no further addition of water. Much of their popularity is undoubtedly due to the fact that no trouble is required in preparation, whereas the other forms require considerable care on the part of the cook. They are as a rule brighter, clearer, and are more palatable than jellies made from powders or tablets, but do not keep well in warm climates. The latter fact depends on two causes: the amount of water they contain, and the possible absence of sterility owing to the fact that they are put up in corked bottles. Moulds rapidly form with fermentation of the contents, bubbles of gas are scattered throughout the jelly, there is a distinct rise of acidity and the power of gelatinising is completely lost. A jelly presenting these appearances is quite unfit for use, for it is liable to produce diarrhœa and intestinal fermentation. There is also a tendency to add preservatives to bottled jellies. It is obvious that until some better means of packing is arrived at, such preparations are unsuitable for hot climates or for use on active service. It will be remembered that a very large quantity of jelly was condemned in the South African War from this cause alone.

Jelly squares or tablets require the addition of water. Being packed in oil-paper and cardboard boxes they do not keep well, as moulds tend to form upon the surface. They are however usually pure and very palatable.

Granulated Jelly Powder.—The contents of a packet require the addition of one pint of water to make a jelly. This form is the ideal one for hot climates and for active service. It requires some care in preparation. The jelly made from it is quite palatable, but usually not so clear as the bottled jellies. Pure gelatine itself is slightly cloudy when set. Cloudiness of a jelly does not detract from its nutritive value, but it is less attractive to the eye. If boiling water be used the jelly is apt to be cloudy. To ensure transparency water below 90° C. only should be used, and a further straining through muslin carried out if necessary.

Samples of these powders on analysis were found to contain:—

Gelatine from 13 to 17 per cent.

Sugar about 80 per cent.

Tartaric or citric acid from 1·5 to 2·5 per cent.

And certain flavouring and colouring matters.

Freshly-prepared calf's foot jelly is prepared from stock jelly made from calves' feet, two being considered sufficient to produce one quart of jelly. It is cleared by means of straining and the addition of the shells and the whites of five eggs. Isinglass is generally added to stiffen it. Jelly properly prepared in this manner is probably superior to all other preparations, but takes longer to make and is decidedly more expensive.

Meat jellies are essentially essences of meat and need not be noticed further.

The essentials of a good table jelly are :—

(1) It must set at ordinary temperatures, or in warm climates on ice. Prolonged boiling destroys the power to form a jelly, and repeated heating and cooling has the same effect. The addition of sugar increases the setting qualities. Jellies set on cooling when the proportion of gelatine exceeds one per cent, the consistency increasing with the concentration; hence makers advise the use of less water in warm weather. The setting qualities depend also to some extent on the source and origin of the gelatine used. Excessive acidity destroys the power to gelatinise. I recently examined three samples of bottled jelly and found in one which set at ordinary temperature acidity equal to 0·35 per cent. as acetic acid; in another which remained liquid at ordinary temperature, but set when placed upon ice, the acidity equalled 0·54 per cent; while in the third sample which remained liquid at all temperatures down to 0° C. the acidity was equal to 0·71 per cent.

(2) The jelly should be as clear and transparent as possible.

(3) It should be palatable and sharp to the taste. Various flavouring agents may be employed such as wine, vanilla, fruit juice, &c. Citric or tartaric acid is generally used to give the necessary sharpness.

(4) Sugar should be about 80 per cent.

(5) No preservatives are allowable. The preservatives to be looked for are sulphurous acid and the sulphites, salicylic acid and the salicylates, benzoic acid and the benzoates. Salicylic acid is sometimes dusted upon the surface of bottled jellies, and readily diffuses through the jelly. Cooks occasionally recommend in hot weather the addition of a pinch of alum to the jelly to hasten the setting, but this cannot be recommended for obvious reasons. Glucose is sometimes added, and although not injurious has been looked upon as an adulterant. No albumin should be present as it penetrates the gelatine and absorbs water.

(6) Any colouring matter should be confined to the harmless varieties, such as burnt sugar, saffron, cochineal, &c.

The Composition and Value of Table Jellies.—A table jelly consists of water, gelatine, sugar, fruit essence, and a vegetable acid. As the essential part of a jelly other than sugar is gelatine it will only be necessary to consider this from a chemical and physiological point of view.

Gelatine.—Gelatine belongs to the class of proteins now called sclero-proteins, but formerly albuminoids. It has the following composition: Carbon 49·93, hydrogen 6·80, nitrogen 17·97, oxygen 35·13, and sulphur about 0·5. It will at once be seen that it has more nitrogen and oxygen and less carbon and sulphur in the molecule than many of the native proteins, such as albumin.

Gelatine is derived from collagen, which itself occurs very extensively in all the vertebrate animals, and, according to Hoppe-Seyler, is also found in the flesh of cephalopods. It is the chief constituent of connective tissue, of bone and cartilage. It is probable that there are several varieties of collagen, and it must be remembered that gelatine obtained from different sources tends to vary somewhat in certain characteristics; hence there may be some foundation for the prevalent idea that jelly made solely from calf's foot is superior to all others. This has been alluded to above.

On boiling with water for some considerable time collagen is converted into gelatine, which may be looked upon as the hydride of collagen, due to the addition of one molecule of water.

If gelatine be heated it loses this molecule of water and again becomes collagen. A. D. Emmett and W. J. Gies (*Proc. Amer. Phy. Soc.*, 1907, II.) state, however, that if gelatine be continuously dried at 130° it is not converted into collagen. The dried product is less soluble than the original gelatine, and is digested by trypsin, whereas collagen is not thus affected. Ammonia being liberated from collagen when it is converted into gelatine by boiling with water shows that gelatine is not a simple hydrate of collagen.

By continuous boiling with water gelatine is converted into a non-gelatinising form called β-glutin, and this reaction may partly account for the fact that some jellies will not set under any ordinary conditions. In the same way repeated heating and cooling destroys the property of gelatinising, and the power to form a jelly is entirely lost by heating under increased pressure to 140° C.

Aqueous solutions of the salts of monobasic acids, except alkali formates and acetates, retard the coagulation of gelatine, while salts of the dibasic and tribasic acids, polyhydric alcohols, and sugars increase the rate of coagulation. Crystalloids which increase the

viscosity of water increase the viscosity of colloidal solutions. Dilute formaldehyde gelatinises a solution of gelatine by converting it into an insoluble substance, while urea has the property of rendering it soluble (Ramsden).

Gelatine, in common with other proteins, can be salted out by neutral salts, and I have found this property convenient in estimating the amount in table jellies, using sodium sulphate to saturation at 30° C. The precipitate can then be collected, the nitrogen determined by Kjeldahl's method and calculated to gelatine from the amount of nitrogen in the molecule already given.

Its behaviour to the colour reactions for proteins requires attention, as this has some bearing on the differences observed amongst certain varieties.

With the biuret test the same colour is produced as for native proteins. With the xantho-proteic reaction and Millon's reagent only a slight reaction is produced, and with the glyoxylic acid test usually none at all.

Pure gelatine probably does not give these reactions, and different varieties give them in different degrees, so that it is more than probable that in many samples of gelatine some true native protein is included.

The conclusions to be derived from these tests are that pure gelatine does not contain the benzine ring, the phenolic group, skatol, tyrosin, or tryptophane in the gelatine molecule.

About 16 per cent. of the total nitrogen occurs as arginine, and not less than 8·4 per cent. as glycine. Gelatine on complete hydrolysis yields the following cleavage products:—

Glycine, histidine, arginine, lysine, and glutamic acid.

Hydrolysis can be carried out by enzymes and by dilute or concentrated acids. Gelatine is hydrolysed completely to simple amino acids by boiling in 25 per cent. H_2SO_4 solution. Leveni and Wallace give the percentage amounts of cleavage products obtained from gelatine, as glycine, 19·25; alanine, 3·00; leucine, 6·75; *a*-protein, 6·25; oxyproline, 6·4; phenylalanine, traces; aspartic acid absent, and glutamic acid 1·75. (*Zeit. Physiol. Chem.*, 1906, 49, 247-251.)

Gelatine has one great advantage—that it is easily digested in the stomach, and also has the power of fixing excess of acidity; thus it can well be prescribed in certain disorders of the gastric digestion. In the first stage of digestion it loses its property of gelatinising, and is formed into gelatine proteoses, gelatose, and gelatine peptones. According to Hofmeister, semiglutin and hemicollin are formed, and

Chittenden and Solley obtained in peptic and tryptic digestion a proteo- and deutero-gelatose, besides a true peptone. Levene found that proto- and deutero-gelatose yielded a larger amount of glycine than gelatine itself. On coming in contact with the pancreatic juice it is dissolved and digested. Pollak has stated that there is a second enzyme in trypsin, which he has called glutinase, which acts only upon gelatine, but this has not yet been generally accepted.

The protein of the food cannot be entirely replaced by gelatine, but gelatine decreases the catabolism of protein to a large extent, in this effect being more powerful than either fats or carbohydrates. It is not only a sparer of protein but spares carbohydrates and fats as well. The physiological availability of gelatine was found by Krummacher to be equal to 3·88 calories for 1 gramme, or 72·4 per cent. of the energy contents of gelatine.

It is possible that gelatine could replace protein if tyrosin, tryptophane, and cystine were added to the diet.

Kauffman has shown by personal experiment that his own needs of nitrogen were nearly met by a mixture of 93 per cent. of nitrogen as gelatine, 4 per cent. as tyrosin, 1 per cent. as tryptophane, and 2 per cent. as cystine.

What little nutritive value table jellies contain is dependent more upon the sugar, amounting to from 50 to 80 per cent., than upon the small amount of gelatine present. The gelatine usually amounts in most table jellies to from 13 to 17 per cent., hence as protein sparers in certain ailments their usefulness is somewhat restricted, and there is no reason to suppose that gelatine is converted into protein within the body. As a source of heat and energy it has decided value, for 1 gramme yields nearly as much of these as 1 gramme of protein or carbohydrate—namely, 4·1 calories. Ordinary gelatine produces 1,570 calories per pound.

Gelatine is a dear food. Hutchinson remarks that a shilling spent on calf's foot jelly of the shops yields only 470 calories of energy and no building material at all.

Analysis.—The analyst is not generally called upon to make a proximate analysis, all that is required being to report upon the quality, composition, the presence of preservatives, and keeping properties of the sample delivered. The setting qualities must be tested according to the directions given for each preparation, and the temperature at which the jelly sets should be noted.

The sugar can be estimated by any usual method after removal of the gelatine. This is best done either by dialysis when the sugar

dialyses out, or by some precipitation method, such as the use of sodium sulphate to complete saturation at 30° C., or by means of subacetate of lead. In the former method, a very simple way communicated to me by Dr. M. S. Pembrey, of Guy's Hospital, is to use a parchment tube doubled in the shape of a U and suspended in water in a beaker by means of a glass rod, to which the free ends are attached.

I have found that the presence of gelatine in various foods can be conveniently detected by the use of Nessler's solution. If some Nessler's solution be added to an aqueous solution containing gelatine, a haze changing to an olive-green precipitate appears on boiling. This rapidly changes to black, and is deposited as a heavy precipitate of mercury. The gelatine acts as a reducing agent, releasing mercury from its combination in the Nessler's solution. The presence of gum, sugar, or liquorice does not interfere with the test. This test can only be produced by the Nessler's solution itself, as none of the reagents composing it, or any combination of them, give the reaction. It appears probable that the test can be applied to a quantitative examination, and I am at present engaged in further investigation.

For a quantitative estimation the following method, although giving approximate results only, is generally sufficient:—

Twenty-five grammes of the material containing gelatine are dissolved in hot water and filtered if necessary to remove any insoluble matter. The solution is evaporated to a thick syrup on the water bath in a platinum capsule, then removed and cooled; 5 cc. of a 10 per cent. solution of formaldehyde is then added, which renders the gelatine insoluble. Other proteins must not be present. The soluble matters, such as sugar, &c., are dissolved out by means of boiling water, when the gelatine remaining behind can be dried and weighed.

The modified Stutzer's method described in "Food Inspection and Analysis" (A. Leach, second edition, 1909), is also to be recommended. Citric acid, tartaric acid, preservatives, and colouring matters can be determined by any of the recognised methods, and their estimation presents no difficulty.

AN INQUIRY INTO A SMALL EPIDEMIC OF PARA-TYPHOID FEVER IN A CAMP IN INDIA.

By Major H. W. GRATTAN and Major D. HARVEY, V.H.S.
Royal Army Medical Corps.

Manora Camp is situated about 4 miles from Naini Tal on the cart road, and accommodates from 100 to 150 men, who come up from Lucknow for change of air during the hot weather and rains.

This year (1910) the strength of the troops was as follows: Two officers, seventy-eight rank and file, 1st Battalion Highland Light Infantry; two officers, seventy-two rank and file, 8th King's Royal Irish Hussars.

During the previous season (1909) six cases of paratyphoid A fever occurred in the same camp, and notes on these cases were published in the Journal of the Royal Army Medical Corps.[1] The first case in that season occurred within six days of the arrival of the troops in camp. The present outbreak differed, however, in this respect—that the first case was not admitted to hospital until the troops had been over a month in camp. A table of the cases is given below, with the dates when the men were first conscious of being out of sorts and the dates when they reported sick:—

Case	1st day of illness	Reported sick	Name	Corps	Tent
1	May 6	May 10	Pte. D—	8th Hussars	Next hospital
2	,, 7	,, 10	,, M—	,,	,, ,,
3	,, 11	,, 13	,, R—	,,	Tent A
4	,, 8	,, 13	,, G—	H'land Lt. Inf.	Next H.L.I. cook-house
5	,, 12	,, 18	Cpl. T—	8th Hussars	Next coffee-shop
6	,, 17	,, 19	Pte. B—	,,	Trumpeter's tent
7	,, 25	,, 26	,, W—	,,	Next guard-room
8	,, 29	June 3	,, S—	,,	Tent B

It will be noted that the first four men were taken ill practically simultaneously and were probably infected on the same day, and were followed about a week later by two more, and a week later by the last two cases. Up to date (October 15th) no more cases have occurred. A curious coincidence is that the patients

[1] Notes on some cases of enteric fever in which the *Bacillus paratyphosus* A was isolated from the blood or excreta. By Captain D. Harvey, R.A.M.C., April, 1910.

last year were: five from cavalry (1st Dragoon Guards) and one from infantry (King's Own Regiment).

This year seven were from cavalry and one from infantry. No horses are brought up to the camp.

A table showing last year's cases is attached, with dates for comparison :—

Case	First felt ill	Reported sick	Corps
1 ..	April 12 ..	April 15 ..	1st Royal Dragoons
2 ..	May 6 ..	May 9 ..	,, ,, ,,
3 ..	,, 9 ..	,, 12 ..	,, ,, ,,
4 ..	June 25 ..	June 29 ..	,, ,, ,,
5 ..	July 25 ..	July 26 ..	King's Own Regt.
6 ..	August 19 ..	August 22 ..	1st Royal Dragoons

It will be noted that in 1909 the patients came in at intervals, and the influence of contact infection could not be excluded.

In 1910 the first four were admitted simultaneously, and must have been infected after arriving in camp; and as two others were admitted in the course of a week we decided to make every effort to discover the cause of the infection.

One of us previous to the outbreak of fever had already examined the urine and fæces of the natives employed in the camp. The blood of several of these men gave positive reactions in low dilutions to *B. typhosus*, as is common in natives of India, but the results of the examinations of the urine and fæces were negative.

One sample of fæces plated on Fawcus's modification of Conradi's medium showed numerous non-lactose fermenting colonies, which resembled the appearance of those of the typhoid group. This organism gave the cultural reactions of Gaertner's bacillus (with the exception that it produced indol). It was readily agglutinated by paratyphoid A serum, but after absorption it failed to remove the agglutinins for paratyphoid A from the serum; *i.e.*, after absorption the paratyphoid serum failed to agglutinate this bacillus, but the *B. paratyphosus* A was still agglutinated readily.

It may be noted at this point that bacilli which were agglutinated by paratyphoid serum were frequently met with.

We were thus in a position to say that none of the natives employed in connection with food were carriers of bacilli of the typhoid group. Fortunately, owing to the great reduction this year in enteric fever cases it was possible to stop the laboratory work in connection with the enteric depot and to turn all the resources of the laboratory on to the question of the camp outbreak.

The methods adopted were first of all to estimate the Widal reactions of all the men of the 8th Hussars to *B. typhosus* and

B. paratyphosus A. A statement is attached showing the results of these examinations; it may be said at once that although practically all showed agglutination for *B. typhosus* (inoculation), only one man showed agglutination for *B. paratyphosus* A. This man, Private G., 8th Hussars, was removed from the camp at once (May 25th) and admitted into hospital. It was subsequently discovered that this man had been employed as a cook orderly in the 8th Hussars cook-house in camp from April 7th until May 11th, when he was struck off duty as he had been late on several occasions at the issue of rations.

The previous history of this man is interesting. He had been admitted to hospital on January 1st, 1910, with fever and pain in the side; on admission he stated that he had been unwell for several days. His fever ran an irregular course, and was at first thought to be malarial in origin, but persistent pain in the hepatic region directed attention to the liver; this organ was not explored, as his temperature became normal and he rapidly became convalescent, although still complaining of pain in the right side. No Widal test was done at this time. He was sent up for change of air with the other troops to the hills in the beginning of April, about a month after his discharge from the hospital.

It appears to us probable that this man had had an attack of paratyphoid A fever followed by cholecystitis, the pain in the side and the irregular fever being due to this cause.

The urine and fæces of this man were examined as soon as he was admitted to hospital from the camp, but always with a negative result, although on several occasions colonies were fished which agglutinated with paratyphoid A serum, but were not agglutinated by paratyphoid B or typhoid serum, but subsequent investigation invariably proved that the organisms belonged to the coli group. In spite of the fact that this man is not a "chronic carrier," we consider that he was the cause of the epidemic for the following reasons:—

(1) He suffered from an irregular fever during January and February; this fever produced in his blood a high agglutination titre for *Bacillus paratyphosus* A (up to 1-200).

(2) Within six weeks of his discharge from hospital he was employed in connection with the food supply at the camp.

(3) The first two cases from the camp lived in the same tent with this man.

(4) He was struck off duty as cook orderly on May 11th, and the last case of fever occurred on or about May 29th, and there have been no cases subsequently.

The proportion of cases that are infective during and after true enteric fever among young men is approximately as follows:—

During the fever	Up to 1 month	Up to 2 months	Chronic carriers [1]
58 to 80 per cent. ..	20 per cent. ..	10 per cent. ..	2 per cent.

This man would come under the class of acute carriers.

The urine and fæces of every man among the 8th Hussars were also examined, but all with negative results; it may be added incidentally that two at least of the men who subsequently developed fever were examined during the incubation period.

The men of the Highland Light Infantry were also examined *seriatim*, and here again one man was found whose serum gave a positive reaction to *B. paratyphosus* A, but only in low dilutions as compared with the reaction of Private G.'s serum. The examination of this man's excreta was negative. He had an admission to hospital in September, 1909, for pyrexia (ten days), and it is possible that this was an attack of paratyphoid fever. It will be seen that although we are of opinion that we discovered the cause of this small epidemic, the epidemic would have ceased without our help, as this man (Private G.) had already been removed from his duties as cook, and we were not aware that he had been so employed when we first examined his blood; also, he had spontaneously ceased to excrete the bacillus, as 90 per cent. of all infected persons do within two months of their fever.

Further proof that this man must have suffered from an infection of the gall-bladder will be found by studying the results of the Widal reactions of the cases of fever from the camp.

It will be noticed that after a simple blood infection all traces of reaction may disappear within a few weeks, whereas after a prolonged infection, and especially where the gall-bladder is involved a high and persistent reaction is the rule.

Brief Notes on the Cases.

Case 1.—Private D., 8th Hussars. Inoculated, April 1st, 1910,[2] and April 15th, 1910. Admitted on May 13th, 1910, with fever and sore throat; the fauces were congested and the tonsils swollen and covered with muco-pus. *Bacillus paratyphosus* A was recovered from the blood on the seventh day of the disease. The muco-pus was plated out, but no bacilli of the typhoid group could be found. This man passed through a fairly severe attack of fever without any abdominal symptoms. Spots

[1] Those who continue to excrete bacilli more than three months after the termination of the fever.

[2] Inoculated means inoculated against enteric fever.

were noted and the spleen was palpable. The temperature fell to normal on the sixteenth day.

Case 2.—Private M., 8th Hussars. Inoculated November 20th, 1909, and December 3rd, 1909. Admitted on May 13th, 1910, with fever, sore throat, pain in the head and back. *B. paratyphosus* A was isolated from the blood on the eighth day of disease, but not from the throat. The temperature touched normal on the sixteenth day, but rose again, remaining normal after the twenty-third day. Epistaxis occurred daily for four days. On June 14th, the thirty-eighth day of disease, the patient was weak and the pulse feeble; the temperature after being normal for fourteen days again rose. Blood was passed mixed with fæces.

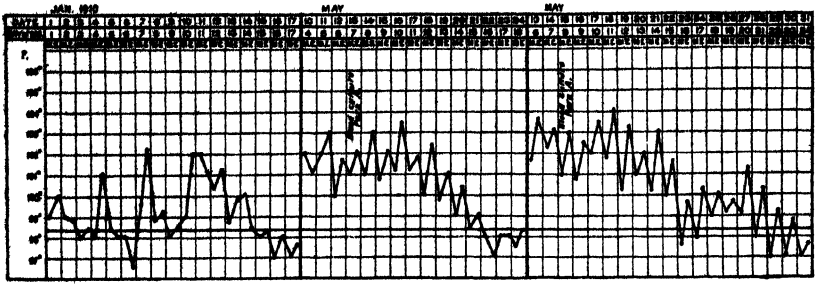
Case 3.—Private R., 8th Hussars. Inoculated November 20th, 1909, and December 3rd, 1909. Reported sick on May 13th, 1910, with headache, fever, pain in the back, and sore throat. The tonsils were inflamed and swollen. *B. paratyphosus* A was recovered from the blood on the eighth day. Pulse-rate 104, no abdominal symptoms, spleen just palpable. A mild case; temperature touched normal on the thirteenth day, but did not finally remain normal until after the twenty-first day.

Case 4.—Private G., Highland Light Infantry. Inoculated September 3rd, 1909, and October 2nd, 1909. Reported sick on May 13th, 1910, with fever, headache, pain in the back, and sore throat. Tonsils swollen, pharynx red and congested, spleen palpable, no spots. *B. paratyphosus* A was isolated from the blood on the seventh day. A mild case; the temperature fell to normal on the twelfth day. Had a rise of temperature during convalescence due to malaria (benign tertian).

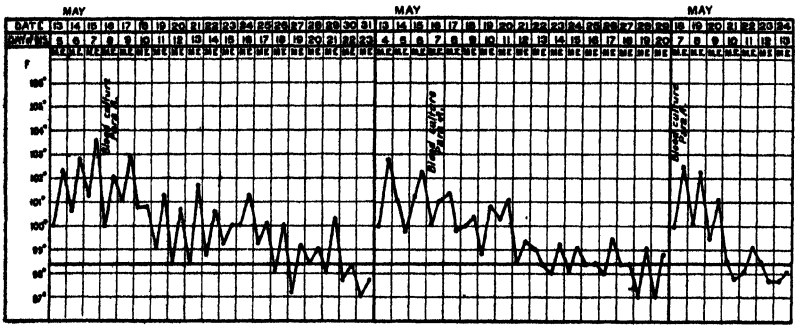
Case 5.—Lance-Corporal T., 8th Hussars. Inoculated on October 2nd, 1909, and December 12th, 1909. Admitted to hospital on May 8th, 1910. A very mild case of fever. *B. paratyphosus* A was isolated from the blood on the seventh day. Temperature fell to normal on the tenth day. With the exception of slight sore throat, fever, and headache, patient did not complain of any symptoms.

Case 6.—Private B., 8th Hussars. Inoculated October 4th, 1909, and October 14th, 1909. Admitted to hospital on May 20th, 1910, with fever, pain in the head and eyes, and sore throat. A mild case; no abdominal symptoms, no spots. Spleen not palpable. *B. paratyphosus* A was isolated from the blood on the fifth day of the fever. Epistaxis daily for four days. Temperature fell to normal on the twelfth day.

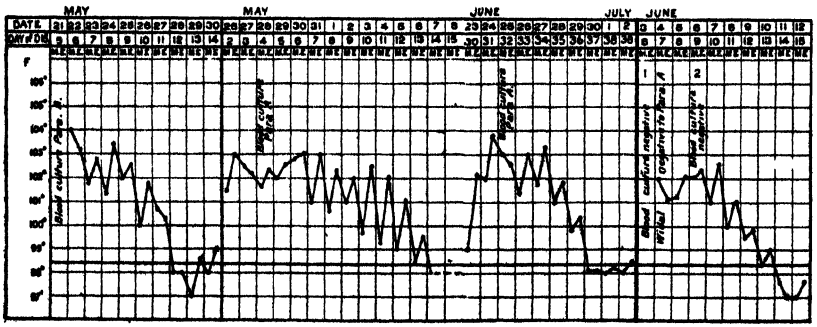
Case 7.—Private W., 8th Hussars. Inoculated October 6th, 1909, and December 6th, 1909. Admitted to hospital on May 26th, 1910. Throat slightly congested, no abdominal symptoms, no spots. *B. paratyphosus* A was isolated from the blood on the fourth day of the disease. On the tenth day a papular rash appeared on the flexor surface of the elbows, and the following day had spread over the whole body, with the exception of the face. The rash when fully developed resembled the rash of measles. Koplick's spots were not present; as the rash faded the temperature



Pte. G., 8th Hussars. CASE 1. CASE 2.



CASE 3. CASE 4. CASE 5.



CASE 6. CASE 7. CASE 8.

dropped and reached normal on the fourteenth day. On June 23rd, 1910, the temperature suddenly rose to 102° F., and the pulse became rapid. On the third day of this relapse the *B. paratyphosus* A was again isolated from the blood. On June 29th, 1910, a diffuse erythematous rash starting on the elbows again appeared. This rash was exactly similar to that seen in the initial attack of the fever. The rash disappeared and the temperature fell to normal on July 2nd, 1910.

Case 8.—Private S., 8th Hussars. Not inoculated. Had a severe attack of enteric fever in Pretoria in 1907. Admitted on June 3rd, 1910, with fever, headache, and slight sore throat; a very mild case of fever. Blood cultures were made on the sixth and again on the ninth day, both, however, with negative results. A rash similar to that of Case 7 appeared on the sixth day of the disease. The temperature fell to normal on the thirteenth day.

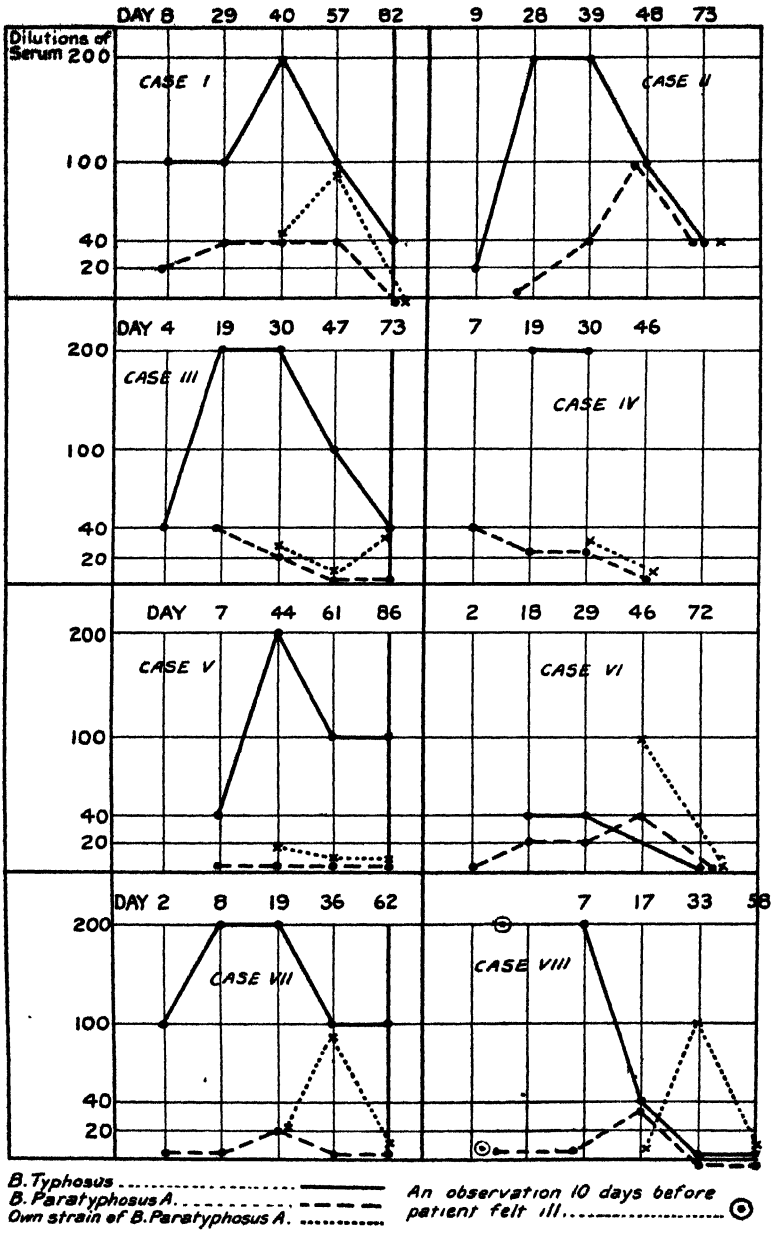
General Notes on the Eight Cases.

All the patients suffered from sore throat; this varied much in severity. The first two men had severe congestion of the fauces with tonsillar abscess; the milder cases showed only congestion. Constipation was the rule in all. Spots were only noted in one case. All suffered from headache and severe pain in the back. *B. paratyphosus* A was recovered from the blood of seven out of the eight cases. The fæces and urine were examined frequently throughout the fever and during convalescence. *B. paratyphosus* A was recovered from the stools of Cases 3 and 4 only, and never from the urine.

Notes on the Agglutinins of the Fever Cases.

A marked increase in the agglutinins for *B. typhosus* was noted in six of the patients. All gave a positive reaction to *B. paratyphosus* A, but in low dilutions (20 to 40) and always incomplete, a distinct contrast to the reaction given by the serum of Private G. (the cook orderly), which gave a complete reaction up to 1 in 100, and marked agglutination in 1 in 200. But for the fact that *B. paratyphosus* A was cultivated from the blood, these cases would have been diagnosed on the Widal reactions as mild cases of true enteric fever, the agglutination for paratyphoid A being so slight that it might have been considered a group reaction, or possibly ignored altogether.

AGGLUTININS.



Case 8 was tried against No. 7 bacillus as *B. paratyphosus A* was not recovered from Case 8.

Case 8 had a severe attack of enteric fever in Pretoria in 1907.

REMARKS ON THE WIDAL REACTIONS OF THE MEN IN CAMP.

8th Hussars.—All had been inoculated against enteric in the autumn of 1909, with the exception of thirteen men who were inoculated in April, 1910. Seventy-three men were tested. Of these—

51,	that is 70	per cent.,	gave a distinct reaction in 1-100.		
[1] 14	,, 19	,,	,,	,,	,, 1-40.
8	,, 11	,,	,,	negative reaction (inoculated in 1909).	
73	100				

Highland Light Infantry.—All had been inoculated either during the first half of 1908 or the latter half of 1909, with the exception of four men who were inoculated in April, 1910. Sixty men were tested. Of these—

35,	that is 58	per cent.,	gave a distinct reaction in 1-100.		
[1] 19	,, 32	,,	,,	,,	,, 1-40.
6	,, 10	,,	,,	negative reaction, 5 of whom had been inoculated in 1908 and 1 in 1909.	
60	100				

RESULTS OF AGGLUTINATION OF THE STRAINS OF BACILLI ISOLATED, WITH SERA SPECIFIC FOR (1) BACILLUS PARATYPHOSUS A AND (2) B. TYPHOSUS.

	Dilutions of *B. paratyphosus* A serum (Kasauli)							Typhoid serum (Berne)		
	1,000	2,000	3,000	4,000	6,000	8,000	12,000	80	160	320
Case 1—Blood strain	+	±	±	...	−	...	−	−	−	−
,, 2— ,, ,,	+	±	±	...	−	...	−	−	−	−
,, 3— ,, ,,	±	±	Trace	...	−	...	−	−	−	−
,, 3—Fæces ,,	±	±	∓	...	∓	...	Trace	−	−	−
,, 4—Blood ,,	+	±	±	±	∓	−	−	−	−	−
,, 4—Fæces ,,	+	±	±	...	∓	...	Trace	−	−	−
,, 5—Blood ,,	+	+	+	+	∓	...	−	−	−	−
,, 7— ,, ,,	+	±	±	...	∓	...	Trace	−	−	−
Stock *B. para.* A..	+	+	±	±	...	−	−	−	−	−
,, *B. typhosus*..	−	−	...					+	+	+

... Test omitted. Blood strain 6 was lost before this table was compiled.

[1] No reaction in 1-100.

CULTURAL CHARACTERS OF SEVEN STRAINS OF BACILLUS PARATYPHOSUS A ISOLATED FROM THE BLOOD, AND TWO STRAINS ISOLATED FROM THE FÆCES.

Strains from the Blood.

	Glucose	Lactose	Cane sugar	Mannite	Litmus milk	Neutral red glucose shake	Indol
Case 1	A.. ..	*Nil* ..	*Nil* ..	A + G ..	A; no clot	G + Fl ..	*Nil*
,, 2	A.. ..	,, ..	,, ..	A + G ..	A ,,	G + Fl ..	,,
,, 3	A.. ..	,, ..	,, ..	A + G ..	A ,,	G + Fl ..	,,
,, 4	A.. ..	,, ..	,, ..	A + G ..	A ,,	G + Fl ..	,,
,, 5	A.. ..	,, ..	,, ..	A + G ..	A ,,	G + Fl ..	,,
,, 6	A.. ..	,, ..	,, ..	A + G ..	A ,,	G + Fl ..	,,
,, 7	A.. ..	,, ..	,, ..	A + G ..	A ,,	G + Fl ..	,,
			Strains from Fæces.				
Case 3	A + G..	*Nil* ..	*Nil* ..	A + G ..	A; no clot	G + Fl ..	*Nil*
,, 4	A + G..	,, ..	,, ..	A + G ..	A ,,	G + Fl ..	,,

The table refers to reactions after ten days at 37° C. in peptone water, containing 1 per cent. of the various sugars with "Durham's tubes." A = acid only. A + G = acid and gas. G + Fl = gas and fluorescence. It will be noted that none of the blood strains showed any gas in glucose peptone water, although all made gas in the neutral red glucose agar shake cultures. Fluorescence appeared in the neutral red tubes in two or three days. Both strains from the fæces showed gas in the glucose peptone water cultures.

NOTES ON FLIES CAUGHT IN MANORA CAMP.

Twelve flies were caught in the 8th Hussars' cook-house and were emulsified in tap-water; a drop of the supernatant fluid was then plated out. The plates resembled those prepared from fæces, and were practically pure cultures of *B. coli*. Amongst the coli colonies were a few clear blue colonies. These were not agglutinated at once by either typhoid or paratyphoid sera. These bacilli gave the following reactions after one week:—

Glucose	Acid and gas
Lactose	No change
Mannite	,,
Cane sugar	,,
Milk	Acid, no clot
Neutral red sugar	Gas and fluorescence
Indol	Trace

These colonies on the Conradi's medium were identical with those of *B. paratyphosus* A, and (except for the fact that they

produced indol and did not ferment mannite) resembled it in their cultural reactions.

Such bacilli are very frequently met with in normal fæces; and it was evident that these flies had been bred out of fæces.

A fly-paper was taken from the coffee-shop, and 150 flies removed from it and emulsified. The emulsion was diluted, and several samples plated out on a series of plates. Numerous coli colonies and some clear colonies (none of which were agglutinated by the specific sera) appeared. These clear colonies in their sugar reactions were found to fall into two classes :—

	A.	B.
Glucose	Acid	.. Acid
Lactose	No change	.. No change
Mannite	,,	.. Acid
Cane sugar	,,	.. No change
Litmus milk	Acid, no clot	.. Acid, no clot
Neutral red sugar	No change	.. No change
Indol	*Nil*	.. Trace

It will be noted that Class B resembles *B. typhosus* with the exception that it produces a trace of indol after ten days. This type of bacillus appears to be common in the intestines of flies; it is non-pathogenic and is of no more significance than *B. coli*.

The drinking-water supply is from a spring in the hillside about a quarter of a mile from camp; this water is brought to the camp in zinc receptacles and stored there in tanks which are kept locked. The supply has been in constant use before, during, and after the epidemic, and the water was not boiled.

The two detachments had separate cook-houses and latrine arrangements, but the coffee-shop was common to both.

There is no doubt that paratyphoid A fever is common in Lucknow, where these troops had come from; one case occurred there in the Highland Light Infantry in May, and cases have been diagnosed by blood culture during the summer, both amongst the military and civil population.

Our thanks are due to Captain H. R. Bond, R.A.M.C., for the notes on the cases; and to Lieutenant-Colonel Shine, R.A.M.C., for permission to publish the notes; also to Captain J. L. Wood, R.A.M.C., who kindly worked out the cultural reactions of the organisms isolated and assisted in the estimations of the Widal reactions.

MEDICAL HISTORY OF THE SOUTH AFRICAN WAR.

By Lieutenant-Colonel R. J. S. SIMPSON, C.M.G.
Royal Army Medical Corps.

(*Continued from p.* 552, *vol.* xv.)

Diseases of the Eye.—Incidence 11·43 per 1,000 as compared with 13·7 during the previous decade. Nearly half the cases (2,363) were due to catarrhal conjunctivitis, no doubt the result of the dust. Granular conjunctivitis caused only sixteen admissions, interesting in view of the fact that some twenty years before the war an infective conjunctivitis was exceedingly prevalent among the troops then stationed in the Eastern Province of Cape Colony.

The only important cause of inefficiency was ametropia, 859 cases. Most of these were cases of hypermetropia in whom the persistent strain of examining a distant horizon had broken down their accommodation, and the individuals found themselves quite unable to shoot. It does not seem advisable to facilitate the enlistment of hypermetropes: they may remain efficient during their Colour service, but many break down when recalled to service from the reserve.

Diseases of the Ear and Nose.—Incidence 8·94 per 1,000, practically the same as in the previous decade (9·8). About one-third were on account of inflammation of the external meatus: another third were from inflammation of the middle ear (with three deaths), while the rest were from various causes.

Diseases of the Circulatory System.—Incidence 19·67, mortality 0·38 per 1,000, as against 9·1 and 0·32 respectively in the previous decade. The incidence is then rather more than doubled, and the mortality about the same, subject (as in the case of tubercular disease) to the condition that it may have been relatively diminished by the more rapid invaliding during the campaign, and indeed by the short period of observation.

The distribution of cases and deaths, and the incidence-rates among the various groups are subjoined. Practically the whole of the mortality resulted from valvular disease of the heart, other diseases of the heart, and pericardium (pericarditis and endocarditis) and from aneurism, and occurred among the Regulars and Volunteers and the Colonials. There is for all practical purposes no difference between the mortalities among the warrant and non-commissioned officers and men of the different groups.

DISEASES OF THE CIRCULATORY SYSTEM.

Officers.

	Regulars and Volunteers			Imperial Yeomanry			Colonials			Total		
	Cases	D.	Ratio	Cases	D.	Ratio	Cases	D.	Ratio	Cases	D.	Ratio
Valvular disease of heart	20	1	1·73	2	–	1·61	5	1	1·32	27	2	1·63
Other diseases of heart, &c.	7	1	0·61	1	–	0 80	3	—	0·79	11	1	0·66
Disordered action of the heart	19	–	1·64	4	–	3·23	5	—	1·32	28	—	1·69
Aneurism	1	–	0 08	–	–	—	1	—	0·26	2	—	0·12
Varix	16	–	1·38	–	–	—	3	—	0·79	19	—	1·14
Other diseases of vessels	24	1	2·07	–	–	—	6	1	1·59	30	2	1·81
Total	87	3	7·52 ±0·50	7	–	5·64 ±1·28	23	2	6·08 ±0·78	117	5	7·05 ±0·40
Men.												
Valvular disease of heart	2,140	59	6·34	227	3	9·18	246	13	3·03	2,613	75	5·88
Other diseases of heart, &c.	225	37	0·67	7	1	0·28	33	10	0·41	265	48	0·60
Disordered action of the heart	3,208	3	9·51	206	..	8·33	217	..	2·67	3,631	3	8·17
Aneurism	95	31	0·28	5	..	0·20	10	3	0·13	110	34	0·25
Varix	1,419	1	4·20	128	..	5·17	227	..	2·80	1,774	1	3·99
Other diseases of vessels	258	5	0·76	36	1	1·45	53	..	0·65	347	6	0·78
Total	7,345	136	21·77 ±0·15	609	5	24·62 ±0·60	786	26	9·68 ±0·21	8,740	*167	19·67 ±0·12
Mortality ..	0·40 ± 0·02			0·20 ± 0·05			0·32 ± 0·03			0·38 ± 0·01		

* 36 of these deaths occurred out of hospital.

The incidence among the officers is seen to be invariably much less than among other ranks (but see later). In the Regulars and Volunteers it amounts to less than one-half: in the Imperial Yeomanry to probably less than one-fourth: in the Colonials to about two-thirds. Here again the greater similarity between officers and men than in the other groups may be observed, probably because here, the social distinctions and all that these connote, were less well marked.

The incidence-rates in order of magnitude are as follows :—

Men	Imperial Yeomanry	24·62	Each of these is quite distinct from that succeeding it.
	Regulars and Volunteers ..	21·77	
	Colonials	9·68	
Officers	Regulars and Volunteers ..	7·52	These rates are indistinguishable.
	Colonials	6·08	
	Imperial Yeomanry	5·64	

From time to time, considerable stress has been laid on the importance in the production of diseases of the heart of our methods of training the soldier. It may be well, then, to call attention to the fact that the incidence among the Imperial Yeomanry (who received no training of the type to which the Regular soldier is subjected) exceeded that among the Regulars and Volunteers. This is additional evidence that the soldier's training is at the worst only a subsidiary element in the production of these diseases.

Comparing the total incidence of all types of disease as between officers and men, there is a total difference of 12·62 per 1,000 made up as follows :—

Increase among the men in :—

Valvular disease of the heart	4·25	13·59
Disordered action of the heart	6·48	
Varix	2·86	

Decrease among the men in :—

Other diseases of the vessels	1·03

That is to say, valvular disease of the heart accounts for 31 per cent. of the increase, disordered action for 47 per cent., and varix for 21 per cent.

The incidence and mortality may be compared with that in South Africa during two periods of five years—in the first some troops were in the field in every year of the period, while 1879-80-81 formed a war period. In the second, no troops were in the field except the few in Matabeleland and Mashonaland.

War Period, 1899-1902. Regulars and Volunteers Only.
Incidence 21·77 ; Mortality, 0·40 per 1,000.

1878	Incidence	17·8	Mortality	1·42	As regards the mortalities, the number of deaths is always small, and the ratios must, therefore, not be compared too closely.
1879		22·4		0·88	
1880		20·9		1·44	
1881		15·5		0·19	
1882		12·2		0·51	
1894		5·7		0·32	
1895		13·5		0·86	
1896		5·7		0·23	
1897		6·3		0·14	
1898		7·9		1·08	

Practically the incidence during the South African War was the same as that during the war period 1879-80, while the mortality was almost certainly less. During the last five years before the war, the incidence-rate was distinctly less.

Valvular disease of the heart (5·88 per 1,000) is the most important item in the table, though not the largest numerically,

Of the 2,613 admissions, 75 died (including 9 out of hospital) and 1,895 (72·6 per cent.) were invalided, while 643 (24·6 per cent.) returned to duty.

Valvular disease in the soldier is, speaking generally, not so serious an affection as in civil life; it is more often a pathological condition of the valves, revealed by abnormalities in the sounds, than a true disease of the heart as the principal organ of the circulation. There is little doubt that many men invalided from the Service on this account would now be accepted by most insurance companies without demur, so that the incidence in the Army is artificially exaggerated as compared with that among civilians. There are, however, several factors which tend to make the diagnosis of heart disease (and of consequent unfitness for service) more dogmatic than would be the case under different circumstances. The most important of these is the doubt whether a heart which is to some extent abnormal will stand the strain of active service. Those who look upon this uncertainty as to the progress of the case as *the* important element are probably justified by the figures given above, which show that incidence in war is about double that in peace, even where those obviously unfit have been eliminated. This view is generally held throughout the Army, and as the soldier comes up for medical examination at comparatively frequent intervals, his fate is most usually determined on these lines.

There is, of course, an important difference between the soldier and the civilian, which necessitates a different method of dealing with doubtful cases such as this. As regards the civilian, the prognosis of his condition is essentially one which concerns him alone. On the other hand, the soldier, unless he is fit for war, has no excuse for existence; the unavoidable wastage among previously healthy men is often so great as to hamper the operations of an army in the field, and our efforts are now more especially directed to diminishing this loss. We cannot retain men with the Colours who will in all probability break down. So long as we maintain a comparatively small army by voluntary enlistment we must ensure, as far as we can, that every member of it is, without reasonable doubt, fit for any duty that may be required of him.

It is sometimes said that these cases should be retained with the Colours because they have broken down in the Service, and that their discharge by invaliding has a bad effect on recruiting, and generally shows a want of sympathy with a most deserving class of men. But the efficiency of an army for war is not a subject which lends itself to philanthropic treatment; the two

things, efficiency, and the care of those who have broken down in the Service, must be kept absolutely distinct.

Disordered action of the heart showed a relatively heavy incidence among the men (8·17). The Regulars and Volunteers and the Imperial Yeomanry were alike in this respect. Of 3,631 cases admitted, 3 died; 1,470 were invalided (41 per cent.) and 2,158 (59·5 per cent.) returned to duty. As the last proportion is so high, the total probably includes many duplicate, or even triplicate, admissions, so that the actual incidence was probably less than that shown.

Etiology.—The most fruitful cause of heart disease (acute rheumatism) was not of great importance, and cannot have formed an important element in causation. Some of the deaths from endocarditis and pericarditis were in all probability due to this cause.

Three factors undoubtedly contributed to the increased prevalence:—

(*a*) During the war the examination of recruits on enlistment was less stringent than it was either before or after. The proportion of all recruits presenting themselves for enlistment, who were rejected on account of disease of the heart, was during 1899-1900 less than in the preceding or succeeding years. Over the period 1889-1908 there existed a distinct, though small, inverse relationship between the numbers so rejected and the admissions for diseases of the heart in the United Kingdom. This laxity in examination accounts for some, probably a small part, of the increase.

(*b*) The unavoidable mental and physical strain of the campaign affected both officers and men, of which the former probably told more on the officer and the latter on the man. Mental and physical work under stress is without doubt an element in producing increased blood-pressure, with the usual results. The actual demands on the bodily strength of the men were at times very great and heavier than on the officers, though as most officers carried a rifle or carbine, there was less difference in this respect than is usual.

(*c*) The general malnutrition. The field-ration was good and ample. But the very general prevalence of dental caries, the loss of teeth, and the associated oral sepsis, made it impossible for many of the men to chew the bully beef and biscuit, or to digest the lumpy mass which they swallowed. The officers were better off in this respect; their teeth were, as a rule, in better condition, and they had more opportunity of adding to the ration than the men.

These three factors do not, of course, hold that predominant position in peace that they assume during war. As regards *disordered action of the heart*, observations carried out at Millbank and at the Royal Herbert Hospital show that in the young soldier disordered action of the heart, pure and simple, is not a common condition.[1] Many so-called cases are, in fact, consecutive to digestive troubles, and these were probably numerous during the campaign, for reasons given above. In most cases, however, the cardiac symptoms are associated with a general condition of increased irritability of the skeletal muscles and of the vasomotor system, associated also with a very variable pulse-rate, and a relatively high blood-pressure (about 140 mm.), both of which are affected by bodily or mental exertion, but where the actual effect of these stimuli cannot be foretold; they may be followed by an increase or decrease in either pulse-rate, or pressure, or both. The following extract from the report by Major Smith, D.S.O., agrees with the experience gained in the observations mentioned above :—

"Some of the patients were very bad; their nervous system generally seemed out of order, and they could not stand long in one position without shaking all over. The Principal Medical Officer, No. 2 General Hospital, says that there were several varieties of pulse, simple increased frequency, the same with irregularity or intermittence. In some patients the affection was constant, though always increased by exertion, others were all right when at rest."

It has been shown that functional nervous affections were more prominent among the officers than among the men. It is likely that this accounts to some extent for the difference in the opposite direction in the case of disordered action of the heart. Both conditions appear to be alike in origin, a failure (probably congenital) of the normal process of repair, a local malnutrition, of which the symptoms were perhaps more obviously of the general nervous system among the officers, and of the cardio-vascular system among the men, for the whole experience of the incidence of disease (other than epidemic) in war shows that it is those systems of the body which are especially overworked that break down.

Aneurism.—Taking into account the large number of older men, reservists and others, especially in the South African Colonials, aneurism was comparatively rare. One may note in this connection that, although the work was heavy, the clothing of the men was

[1] See JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, December, 1910, p. 712, *et seq.*

loose, and the way it was worn diminished constriction of the chest and at the root of the neck. *Varix* is the only other disease demanding special mention. The prevalence was not greater among the Regulars and Volunteers (mostly infantry) than among the Imperial Yeomanry (entirely mounted).

The Effect of Altitude.—The field of operations was for the most part between 4,000 and 5,000 feet above sea-level, and the atmosphere was for the greater part of the year intensely stimulating. It was the custom of the inhabitants of Johannesburg and Pretoria to blame these two conditions for the production of nervous disturbances of these two types, which were comparatively common. It is impossible to differentiate between the effects of these conditions and those due to the general mode of life, where business was carried on at high pressure, and stimulants, tea, coffee and alcohol, were used to excess, the first two indeed were as harmful as the last. But apart from this, it is probable that the general effect of the climate induced (as in the case of the Swiss winter resorts) weaker brethern to more excessive exertion than they were, in fact, capable of undertaking, and in this way influenced the production of these disorders.

Diseases of the Respiratory System.—Incidence 30·66, mortality 1·29, as against 28·1 and 0·42 respectively in the previous decade. Of the deaths, 81 per cent. were due to pneumonia, 6 per cent. to phthisis, 4 per cent. to pleurisy. The total deaths from phthisis were thirty-five, and of these the Colonial troops contributed the unduly large number of twelve, as against nineteen in the Regulars and Volunteers of about four times their strength. This was probably due to the enlistment of old cases in the South African Colonials, and the point was noted in the reports from at least one general hospital.

The distribution of the cases is as follows :—

DISEASES OF THE RESPIRATORY SYSTEM.

Officers.

Disease	REGULARS AND VOLUNTEERS			IMPERIAL YEOMANRY			COLONIAL			TOTAL		
	Cases	D.	Ratio	Cases	D.	Ratio	Cases	D.	Ratio	Cases	D.	Ratio
Bronchitis catarrh	107	..	—	16	..	—	43	..	—	166	..	—
Pneumonia ..	38	6	3·28	3	..	2·42	10	2	2·65	51	8	3·07
Phthisis	8	..	—	1	1	—	5	2	—	14	3	—
Pleurisy	30	1	—	8	..	—	8	..	—	41	1	—
Other diseases ..	49	2	—	6	1	—	15	..	—	70	8	—
Total	232	9	20·05 ±0·29	29	2	23·41 ±7·42	81	4	21·43 ±1·46	342	15	20·60 ±0·69

Men.

Disease	Regulars and Volunteers			Imperial Yeomanry			Colonials			Total		
	Cases	D.	Ratio	Cases	D.	Ratio	Cases	D.	Ratio	Cases	D.	Ratio
Bronchitis catarrh	6,089	15	17·89	408	..	16 50	1,640	7	20·19	8,087	22	18·20
Pneumonia ..	2,089	378	6·19	113	15	4·56	389	71	4·79	2,591	464	5·83
Phthisis	286	19	0 85	35	4	1 42	100	12	1·23	421	35	0·98
Pleurisy	1,121	19	3·25	82	2	3·31	212	..	2·60	1,415	21	3·18
Other diseases ..	793	21	2·35	71	3	2 87	240	6	2·96	1,104	30	2·48
Total	10,328	452	30 61 ±0·18	709	24	28·66 ±0 64	2,581	96	31·79 ±0 37	13,618	572	30·67 ±0·16

The following is the series in order of magnitude :—

Men	Colonials	31·79
	Regulars and Volunteers	30·61
	Imperial Yeomanry	28·66
Officers	Imperial Yeomanry	23·41
	Colonials	21·43
	Regulars and Volunteers	20·05

The Colonial troops head the list on account of a greater prevalence of catarrhal bronchitis. But there is no very striking difference except perhaps the lesser incidence of phthisis among the Regulars and Volunteers.

From its fatality, pneumonia is the most interesting item. Of 2,591 cases among the Warrant and N.C.O.'s and men, 464 died in hospital, giving a case mortality over all of 17·10 per cent. There are no essential differences in the case-mortality among the officers and men, or among the various groups, all approximate to this proportion. Little more need be said of these diseases. Major Erskine points out (and see below) that the inhalation of dust-laden air was a frequent cause of bronchitis. Major Smith says :—

"Diseases of the respiratory system were most common during the colder part of the year. The Medical Officer of No. 17 General Hospital attributes this partly to the extreme variations between the day and night temperatures (60° F. in the daytime, and 17° F. at night), and partly to the quantity of dust at this season of the year, which causes irritation of the air passages.

"However brought about, pneumonia—to take the most important of these diseases—showed a marked increase in its incidence during the cold season. It occurred sporadically in all parts of the country, and an examination of the recorded cases shows that 73 per cent. were admitted during the colder six months of the year, and exactly one-half during the three months of greatest cold, viz., June, July and August.

"An examination of the clinical and pathological records appears to show that a considerable proportion of the cases diagnosed as pneumonia were not pure croupous pneumonia. The available records show that the right lung was the seat of the lesion in 40·59 per cent., and the left in 27·53 per cent.; while both lungs were involved in 31·53 per cent. The large majority of the double pneumonias were basal in character, and their unusual number, in comparison with cases in which only one lung was the seat of the disease, is probably to be accounted for by the inclusion in this group of many secondary pneumonias, dependent on various specific diseases."

Diseases of the Digestive System.—Incidence 142·07, mortality 0·66 per 1,000 as against 107·7 and 0·45 respectively during the previous decade. This heterogeneous group of diseases always contributes largely to the list of admissions, at home or abroad, in peace or war. It is characterised by a very great difference between prevalence and fatality; two diseases included therein in great part belong to the group of climatic diseases, *i.e.*, hepatic abscess and inflammation of the liver. The easiest way to show the difference in prevalence and fatality is to place the percentage of the total admissions and deaths in parallel columns, as below :—

Caries of teeth, &c.	Admissions per cent.	11·0	Deaths per cent.	—
Sore throat and Tonsillitis	,,	17·5	,,	0·7
Gastritis and Dyspepsia	,,	9·5	,,	3·5
Hernia	,,	4·0	,,	0·7
Diarrhœa	,,	29·8	,,	7·0
Jaundice	,,	9·8	,,	0·7
Constipation and Colic	,,	4·2	,,	—
Enteritis Typhlitis Colitis	,,	2·7	,,	15·7
Peritonitis	,,	0·2	,,	19·2
Diseases of liver	,,	2·5	,,	43·2
Other diseases	,,	8·8	,,	9·3

The diseases shown above the line account for 86 per cent. of the admissions, but for only 13 per cent. of the deaths.

The diseases of numerical importance have been shown by groups in the table below, and the following particulars are added concerning those of less frequency :—

Officers—			
Diseases of the liver.	Inflammation	Cases 78	Deaths 1
	Abscess	7	6
	Acute yellow atrophy	1	1
"Other diseases."	Enteritis: typhlitis: colitis	229	2
	Peritonitis	8	3
	Unclassified	192	2
Men—			
Diseases of the liver	Inflammation	724	17
(see p. 545, vol. xv.)	Abscess	184	97
	Congestion	612	1
	Acute yellow atrophy	6	5
	Inflammation of gall-bladder	64	1
"Other diseases."	Enteritis: typhlitis: colitis	1,738	45
	Peritonitis	104	55
	Unclassified	5,622	27

The only point to note is the extraordinary fatality of hepatic abscess among the officers; it suggests delay in diagnosis, but the explanation may be that the cases were returned under the heading of the primary disease, dysentery.

The following table gives the distribution by groups :—

DISEASES OF THE DIGESTIVE SYSTEM.

Officers.

	REGULARS AND VOLUNTEERS			IMPERIAL YEOMANRY			COLONIALS			TOTAL		
	Cases	D.	Ratio	Cases	D.	Ratio	Cases	D.	Ratio	Cases	D.	Ratio
Caries of teeth, &c.	85	..	7·35	14	..	11·30	13	..	3·44	112	..	6·74
Sore throat and tonsillitis	220	..	19·01	26	..	20·98	37	..	9·79	283	..	17·04
Stomach	246	2	21·25	33	..	26·63	45	..	11·91	324	2	19·51
Hernia	23	..	1·99	6	..	4·84	9	..	2·38	38	..	2·28
Diarrhœa	650	..	56·16	66	..	53·26	62	..	16·41	778	..	46·86
Jaundice	571	..	49·34	49	..	39·55	59	..	15·62	679	..	40·91
Diseases of liver ..	155	7	13·40	12	..	9·68	27	1	7·14	194	8	11·69
Other diseases ..	357	4	30·85	56	1	45·20	82	2	21·70	495	7	29·82
Total	2,307	13	199·35 ±2·29	262	1	211·44 ±7·14	334	3	88·39 ±2·86	2,903	17	174·83 ±1·88
Men.												
Caries of teeth, &c.	5,680	..	16·84	715	..	28·91	547	..	6·74	6,942	..	15·63
Sore throat and tonsillitis	8,540	2	25·31	1,140	..	46·09	1,307	..	16·10	10,987	2	24·18
Stomach	4,792	9	14·21	443	1	17·91	744	..	9·16	5,979	10	13·46
Hernia	1,818	1	5·39	230	..	9·30	491	1	6·05	2,539	2	5·72
Diarrhœa	14,927	20	44·24	1,596	..	64·53	2,193	..	27·01	18,716	20	42·15
Jaundice	4,657	2	13·80	535	..	21·63	1,002	..	12·33	6,194	2	13·95
Diseases of liver ..	1,367	100	4·05	95	8	3·84	174	16	2·14	1,636	124	3·68
Other diseases ..	7,919	103	23·46	682	5	27·57	1,496	19	18·43	10,097	127	22·74
Total	49,700	237	147·30 ±0·37	5,436	14	219·78 ±1·59	7,954	36	97·97 ±0·62	63,090	287	142·07 ±0·32

The series in order of magnitude is as follows :—

Men	Imperial Yeomanry	219·78
Officers	Imperial Yeomanry	211·44
Officers	Regulars and Volunteers	199·35
Men	Regulars and Volunteers	147·80
Men	Colonials	97·97
Officers	Colonials	88·39

The officers and men, Imperial Yeomanry, show practically the same incidence, as do the officers, Regulars and Volunteers, and the officers, Imperial Yeomanry. But all the other groups are distinct. The high place held by the officers other than Colonial is to be noted ; it may be that it is artificial, in that a greater proportion of those affected may have reported sick than in the case of the men. Of course in such a group as this where many of the complaints are often trivial, it cannot be expected that the records of the hospitals shall give the actual prevalence among the men, and the series appears to show that indifference to minor troubles was an element in determining the peculiar distribution.

The only important difference is that between the officers and men of the Regulars and Volunteers, and this is largely accounted for by the difference in the prevalence of jaundice (35·54 per 1,000) and to a lesser degree in that of diarrhœa, and diseases of the liver and stomach. If the incidence-rates for the different diseases shown in the table are arranged in order of magnitude, there is very little similarity between the lists. But a few points are worthy of remark.

Taking the two diseases in which the conditions of service and the stringency of the inspection of recruits might be expected to have some influence, *caries* and *hernia*, the men of the Imperial Yeomanry show a distinctly higher prevalence than any other group, probably to be explained on these grounds. As regards *caries*, the Colonial officers showed by far the smallest incidence. As regards *hernia*, the officers, as might be expected, always showed a smaller prevalence than the men. In *diseases of the stomach, including dyspepsia*, the officers always showed a higher incidence than the men, the same thing is more distinctly shown in *diseases of the liver*. In *diarrhœa*, the men of the Imperial Yeomanry show the greatest prevalence, next officers of the Regulars and Volunteers, and lastly the men. Altogether the distribution of these diseases is very curious ; there was probably some extraneous influence at work which affected it, but nevertheless, it appears that the officer, on the whole, is more likely to suffer from disease of the abdominal organs to such a degree as to incapacitate him than the man.

The mortality ratios have not been worked out; it appears unnecessary to add anything to what has been said on this point.

Caries of the teeth and its accompaniments, including pyorrhœa alveolaris, was much more important than is shown by the admissions to hospital. It is a very serious matter in relation to inefficiency, and is one of several things for which the only remedy is preparation during peace. There is among men with the colours not only a considerable prevalence of dental caries, but a septic condition of the mouth is almost more common.

Much can be done by training the men to use a tooth-brush regularly, and the dental treatment now available is not only highly appreciated by the men, but decidedly effective in improving their condition. Observation leads to the conclusion that in the long run it will not pay to admit of much relaxation in the conditions affecting the dental efficiency of the recruit.

Of 6,942 admissions for caries, &c., to hospital, about one-third were invalided to England, the remaining two-thirds were nominally returned to duty, but many of them were unfit for duty in the field and had to be retained within reach of soft food.

Diarrhœa.—Major Erskine, among others, remarks on the depressing effect of this disease in a considerable proportion of cases. There is no evidence of the true nature of these cases, which may have been of a specific type.

Jaundice.—This was described by Major H. B. Mathias, D.S.O., as *epidemic catarrhal jaundice*, which it resembled in many respects. The cause appears to be unknown. Some authorities hold that a proportion of these cases are caused by *B. typhosus*, by the two varieties of the paratyphoid organism, and by *B. coli communis*. This would correlate the prevalence with that of enteric fever. All that can be said here is, that some investigations carried out to this end during the War failed to produce any evidence of the connection. It may be added that jaundice is not uncommon in South Africa at all times.

Hepatic abscess has already been discussed. (See p. 545.)

Diseases of the Lymphatic System.—Incidence 5·05 per 1,000, as against 23·8 in the previous decade. The decrease is probably correlated with that in venereal sore and gonorrhœa.

Diseases of the Urinary System.—Incidence 4·13, mortality 0·13 per 1,000, as against 2·4 and 0·18 respectively during the previous decade. Of 1,829 admissions and 60 deaths, nephritis of one kind or another accounted for 752 admissions and 50 deaths. Exposure and chill were probably effective in producing these results. Of

the remainder, 282 cases and 3 deaths were due to cystitis. The remainder were due to various causes.

Diseases of the Generative System (including soft chancre).—Incidence 17·15 per 1,000, as against 35·6 in the previous decade. The principal causes of admission were: stricture, 1,167 cases; varicocele, 1,074; orchitis, 2,119; while other diseases caused 1,289 admissions. No doubt the greater part of the decrease occurred in the admissions for soft chancre and orchitis of gonorrhœal origin, which is often returned under this heading instead of that of gonorrhœa.

Venereal Diseases.—These may be considered here. The distribution of the cases is shown in the table below.

VENEREAL DISEASE.

Officers.

	Regulars and Volunteers		Imperial Yeomanry		Colonials		Total	
	Cases	Ratio	Cases	Ratio	Cases	Ratio	Cases	Ratio
Syphilis ..	29	–	4	–	5	–	38	–
Gonorrhœa..	64	–	11	–	24	–	99	–
Soft chancre	7	–	2	–	7	–	16	–
Total ..	100	8·64 ± 0·17	17	13·72 ± 2·03	36	9·52 ± 0·98	153	9·00 ± 0·46
Men.								
Syphilis ..	7,202	–	361	–	1,057	–	8,620	19·41
Gonorrhœa..	6,326	–	470	–	1,742	–	8,538	19·23
Soft chancre	1,550	–	90	–	329	–	1,969	4·43
Total ..	15,078	44·67 ± 0·16	921	37·24 ± 0·73	3,128	38·53 ± 0·40	19,127	43·07 ± 0·19

The series in order of magnitude is as follows:—

Men	Regulars and Volunteers ..	44·67	This difference is distinct.
	Colonials	38·53	This difference is not distinct.
	Imperial Yeomanry ..	37·24	
Officers	Imperial Yeomanry ..	13·72	These ratios are indistinguishable on the figures available
	Colonials	9·52	
	Regulars and Volunteers ..	8·64	

The striking point is the difference between officers and men, too large to be determined by extraneous circumstances. The greater incidence among the men, Regulars and Volunteers, is probably due to a greater prevalence of secondary syphilis among the regular troops, as it is only among them that the admissions for syphilis are greater than those for gonorrhœa.

Two important causes of the decrease were hard work and temperance.

Diseases of the Organs of Locomotion.—Incidence 15·18, mortality 0·02 per 1,000, as against 11·0 and 0·03 respectively, during the previous decade. Inflammation of joints accounts for about half the admissions, largely due to the incidents of the campaign.

Diseases of the Connective Tissue.—Incidence 17·18, as against 30·6 per 1,000 in the previous decade. More than half the admissions were due to abscess. There is no obvious explanation of the decrease, except indifference to trivial affections.

Diseases of the Skin.—Incidence 29·65 per 1,000, as against 53·4 in the previous decade. The great decrease during the War is difficult to explain, except on the ground that the men took such ailments as a matter of course and did not report sick.

Veldt-sore.—This was an important element, perhaps not so much in producing admissions to hospital as in causing discomfort. Much has been written on the subject, without any very definite conclusion being attained. It is unnecessary here to enter into any discussion of the various theories, as distinct evidence in favour of one or the other is wanting. The origin appears, however, to be in all probability bacterial. Major Smith takes this view, he says :—

"As ordinarily seen—a scabby sore with pus exuding from under the hard scab—the ulcer probably nourishes various bacteria not necessarily concerned in the etiology. We base our belief as to the microbial origin on the results of treatment. For we have found that ointments, lotions, &c., applied in the way commonly adopted by the sufferers have little effect. The disease goes on for months, healing here and extending there, while medicaments are carefully placed on the top of the scabs. Whereas, if the scab be removed, the skin snipped off over the inflamed area, and the ulcerated surface thoroughly cleaned—a very simple matter—one, or at most two, applications of crude carbolic will cure the complaint. A strong perchloride lotion, or probably other germicides, will have the same result. So certain in effect is this that some of us while serving with regiments have found that the regimental orderly was able to deal with all veldt-sores when once he had been instructed in the method. The cleaning process was very easily carried out with a piece of wet lint, after the scabs were lifted off and the loosened epidermis in the inflamed area clipped away, so as to allow the remedy to reach every part of the sore.

"One of us (F. S.) describes what he believes to have been a pure veldt-sore on the palmar surface of his own thumb. A small,

itching, flat papule appeared. In the centre was a moist speck. Thinking this might be the veldt-sore he allowed the thing to go on for five or six days. It spread slowly from the margin until it was about the size of a fourpenny bit, when it presented the following appearance :—

"(*a*) Minute opening exuding clear fluid.

"(*b*) Whitened layer of epidermis, separated from the layer below.

"(*c*) Red spreading margin.

"He was not in a position to make a microscopical examination at the time. The sore continued to itch greatly. It looked not unlike an umbilicated vaccination mark. Finally, he clipped off the dead skin (*b*) to where it joined the red areola, wiped away the clear, moist fluid underneath, touched the surface with carbolic, covered up the part with aseptic lint and plaster. On removal of the dressing two or three days later, nothing remained but the dried scar, and that speedily disappeared without further treatment.

"Such a sore as the above on the dorsal surface of the hand of a cavalry soldier, would soon have the skin broken, various organisms would get into the sore, and the ulcer would go on from bad to worse. We have no reliable statistics to show that the men of the cavalry suffer more than the infantry, though we have thought this to be the case. If it be so, it need not necessarily be on account of infection coming from horses or anything connected with them, but might be owing to the more frequent abrasion of the hands among the mounted men. Moreover, the men of the cavalry have, we should say, little opportunity of looking after and keeping clean such abrasions. The veldt-sore was common enough among the infantry in the Transvaal, and we have seen officers with the disease on their faces, ears, &c.

"Though not in itself a serious disease, the veldt-sore, when neglected, leads to a good deal of misery and some amount of more or less permanent disfigurement."

Other General Injuries. — The only injuries coming into the medical history of the campaign are those due to *the effects of heat.* (See JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, March, 1909.) In addition, *lightning stroke* caused 206 admissions and sixteen deaths, all out of hospital. Of the remainder of the cases, fifty-three were invalided. The incidence is remarkably small taking into consideration the frequency of severe storms and the absolute want of protection.

Poisons.—Alcohol accounted for thirty-four admissions, with nine-

teen deaths, and for seventeen deaths out of hospital. The cases were definitely of the type of acute poisoning, the result of accidental access to a quantity of spirit. Exposure to considerable cold was no doubt frequently effective in some of these cases. The most interesting feature here is the appearance of a new habit, *i.e.*, cordite eating, which, however, was not widespread, and apparently mainly confined to those who were in the habit of using drugs. Major Smith says (and see also Major Jennings, D.S.O., JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, vol. i., p. 277) :—

"*Cordite Eating.*—The *cordite habit* appears as a new disease —an outcome of this war. It seems to have been generally talked about, but definite information was wanting. The Principal Medical Officer of No. 2 General Hospital had it in his mind in connection with disordered action of the heart, but he had to report that no man had been discovered eating it in his hospital."

Major J. W. Jennings, D.S.O., and Captain H. M. Morton, both of the Royal Army Medical Corps, made a special inquiry into the matter, and have presented a special report of which the following is an epitome; interesting, not only as a description of the immediate effects of the drug and the later results of the cordite habit, but also in showing how extraordinary and unlooked-for may be the side-results of war.

"Such a trifling matter as a dearth of matches led to a knowledge of the drug. For the men extracted the cords from the Lee-Metford cartridges to light their pipes and cigarettes with, and found that it affected their heads. Thus it may be supposed the fatal knowledge would arise and spread. The craving for drink, which could not be had in the field, would conduce to the use of the narcotic, once it became known.

"The drug is taken in two or three ways, *e.g.*, eaten solid, boiled down in water or tea, or mixed with beer.

"In small doses to those unaccustomed to its use, or to other narcotics, cordite, like some other drugs, has a by no means pleasing effect, as Major Jennings found to his cost on eating a quarter-stick by way of experiment. The stuff was sweet in the mouth, but it gave him a "most racking, splitting headache." The *habitué* is able to take the contents of a cartridge or more. His face flushes, head throbs, and seems to swell, and then in about fifteen minutes, comes long deep sleep. On awakening he has an intense headache, thirst, &c. Taken with beer or hot tea, the first effects are wild delirious intoxication, and this is followed by sleep. Morphia, opium, and alcohol in *small* quantities are "pick-me-ups" after cordite; and apparently some men have used cordite as a reviver

after alcohol. Optical, and mental delusions, timidity, weakness, and general breakdown, moral and physical, result from prolonged use of cordite as a drug."

CONCLUSION.

The Influence of Climate on the Incidence of these Diseases.—Confining our attention to those diseases which are not epidemic in character, we have in the South African War an example of a campaign carried on in a country in which the climatic conditions are entirely favourable. The troops at the end of the War formed, perhaps, the healthiest body of men that has ever been seen. True, they were rather "fine" as a result of their exertions, but physically and mentally they could not have been better.

The whole conditions of the campaign were, however, so unusual that it is difficult to say how far our experience there is likely to assist us in other and less favourable climates. There is little doubt, for example, that the effects of exposure to the elements were in South Africa less detrimental than they would be in Europe, probably because of the greater dryness of the atmosphere and the more continuous sunshine. Men were not drenched with cold rain for days at a time as our experience sometimes is in this country. On the other hand, the intensity of the heat was mitigated, as compared with a tropical climate, by the prevalent breezes and the cool nights. The fact that these conditions were favourable, however, emphasises the effects produced by the stress of a campaign. These effects may be divided into two classes: those due to exposure, diseases of the respiratory and urinary systems and rheumatism, and those due to hard work under unfavourable conditions, diseases of the nervous, of the circulatory, of the digestive system, and of the organs of locomotion. There is little doubt that in such a climate as England, the effects of exposure would be of far greater importance, while in the second group the effect of differences of climate can only be indirect.

The Components of the Force in relation to Disease Prevalence.—In this campaign we have an opportunity of studying the incidence of disease in three bodies of men, to a great extent different in origin and composition (see also p. 394, vol. xv.), each large enough to give a close approximation to true results, and all (with one minor exception) exposed to infection and to other, adjuvant, causes of disease in the same degree. The minor exception is in the lesser exposure of the Imperial Yeomanry to malarial infection.

The first of these bodies, the Regulars and Volunteers, was composed as follows: Regulars 74 per cent., Militia 18 per cent., Volunteers 8 per cent. Further, the period of exposure of the

Regulars was greater than in the case of the other two components, hence the statistics relating to this group may be regarded with some confidence, as expressing the prevalence and mortality in the *Regular Army*. If there is any error in this assumption, the result must be that the sick-rate among the Regulars is even less than that shown here.

In the second group, the Imperial Yeomanry, the principal feature to note here is that they were drawn almost entirely from Great Britain, and were without previous training. There were other differences also in the standard required, and in the examination of recruits. (See p. 624, vol. xiii.)

In the third group, the Colonial troops, were included men of many different types, from the best to the worst, but the group was characterised as a whole by greater experience of a rough life, away from the resources of a thickly populated country, in which process the weaker elements had been eliminated. They were accustomed to look after themselves to a much greater extent than the other groups, and perhaps also took less notice of minor ailments. On the other hand, in the later stages of the campaign, a proportion of the Colonial troops, raised in South Africa, spent the greater part of their short period of service in hospital.

These differences in the general characteristics are reflected in the relative prevalence of disease, as shown in the following table.

TOTAL INCIDENCE.

Officers.

	REGULARS AND VOLUNTEERS		IMPERIAL YEOMANRY		COLONIALS		TOTAL	
	Cases	Ratio	Cases	Ratio	Cases	Ratio	Cases	Ratio
Climatic diseases	4,586	369·33 ±2·84	446	359·92 ±5·94	801	211·96 ±4·12	5,833	351·27 ±2·31
Other general diseases	1,562	135·00 ±1·99	217	175·12 ±4·71	405	107·17 ±3·12	2,184	131·53 ±1·64
Local diseases ..	3,630	313·72 ±2·70	462	372·83 ±6·05	677	179·14 ±3·86	4,769	287·21 ±2·19
All diseases ..	9,778	845·03 ±2·10	1,125	907·87 ±3·58	1,883	498·27 ±5·42	12,786	770·01 ±2·04
Men.								
Climatic diseases	123,115	364·87 ±0·51	10,444	422·26 ±1·90	20,422	251·55 ±0·91	153,981	346·73 ±0·43
Other general diseases	61,311	181·71 ±0·40	5,966	241·21 ±1·65	13,212	162·74 ±0·78	80,489	181·25 ±0·35
Local diseases ..	109,313	323·96 ±0·49	10,865	439·28 ±1·91	18,688	230·18 ±0·89	138,866	312·71 ±0·42
All diseases ..	293,739	870·54 ±0·35	27,275	1,102·75 ±1·23	52,322	644·48 ±1·01	373,336	840·69 ±0·32

TOTAL MORTALITY.

Officers.

	REGULARS AND VOLUNTEERS		IMPERIAL YEOMANRY		COLONIALS		TOTAL	
	Deaths	Ratio	Deaths	Ratio	Deaths	Ratio	Deaths	Ratio
Climatic diseases	186	16·07 ±0·74	21	16·95 ±1·60	37	9·79 ±0·99	244	14·70 ±0·58
Other general diseases	7	0·60 ±0·14	–	–	4	1·06 ±0·33	11	0·66 ±0·12
Local diseases ..	26	2·25 ±0·27	4	3·22 ±0·70	10	2·64 ±0·52	40	2·41 ±0·24
All diseases ..	219	18·92 ±0·79	25	20·17 ±1·74	51	13·49 ±1·36	295	17·77 ±0·64
Men.								
Climatic diseases	7,710	22·85 ±0·15	757	30·60 ±0·66	1,006	12·39 ±0·23	9,473	21·33 ±0·13
Other general diseases	174	0·52 ±0·02	18	0·53 ±0·09	58	0·71 ±0·06	245	0·55 ±0·02
Local diseases ..	962	2·85 ±0·06	51	2·06 ±0·17	184	2·27 ±0·10	1,197	2·70 ±0·05
All diseases ..	8,846	26·22 ±0·17	821	33·19 ±0·69	1,248	15·37 ±0·26	10,915	24·58 ±0·14

Notes.—(1) N.A.D. has not been included.
(2) The cases and deaths are those recorded; the ratios have been corrected as before.

The following lists of the incidence-rates in order of magnitude are, however, more convenient for comparison.

CLIMATIC DISEASE (*i.e.*, ENTERIC AND SIMPLE CONTINUED FEVER, MALARIAL FEVER, AND DYSENTRY).

Men	Imperial Yeomanry	422 per 1,000
Officers	Regulars and Volunteers	396 ,,
Men	Regulars and Volunteers	365 ,,
Officers	Imperial Yeomanry	360 ,,
Men	Colonials	252 ,,
Officers	Colonials	212 ,,

All these ratios are distinct except those referring to the Officers Imperial Yeomanry, and men Regulars and Volunteers, which are practically identical.

OTHER GENERAL DISEASES.

Men	Imperial Yeomanry	241 per 1,000
Men	Regulars and Volunteers	182 ,,
Officers	Imperial Yeomanry	175 ,,
Men	Colonials	168 ,,
Officers	Regulars and Volunteers	135 ,,
Officers	Colonials	107 ,,

	LOCAL DISEASES.	
Men	Imperial Yeomanry	439 per 1,000
Officers	Imperial Yeomanry	373 ,,
Men	Regulars and Volunteers	324 ,,
Officers	Regulars and Volunteers	314 ,,
Men	Colonials	230 ,,
Officers	Colonials	179 ,,
	ALL DISEASES.	
Men	Imperial Yeomanry	1,103 per 1,000
Officers	Imperial Yeomanry	908 ,,
Men	Regulars and Volunteers	870 ,,
Officers	Regulars and Volunteers	845 ,,
Men	Colonials	644 ,,
Officers	Colonials	498 ,,

In this series all the ratios are quite distinct.

"Other general diseases" are seen to take but a small part in the determination of this final sequence, which shows the Regulars and Volunteers holding a position midway between the other groups. It is also to be noted that in each group, the officers show a lesser incidence than the men.

The sequence in the mortality table for "climatic diseases" and for all diseases is the same as that for enteric fever alone (see p. 397, vol. xv.). The mortality series in other general diseases and in local diseases do not show significant variations between the various groups.

As shown above, the Regulars and Volunteers hold a position midway between the other groups. Taking first the comparison with the Imperial Yeomanry, the greater incidence for *all diseases* in the men of the Imperial Yeomanry than in the men of the Regulars and Volunteers amounts to 232·21 per 1,000, made up thus: climatic disease, 57·39; other general diseases, 59·50; local diseases, 115·32. In climatic disease, the Imperial Yeomanry show a greater prevalence in every disease except malaria. In the greater prevalence of local diseases, those of the digestive system are the most important and account for 72·48 per 1,000, of which the following diseases account for 60·97 : jaundice 7·83, diarrhœa 20·29; sore throat and tonsillitis 20·78; and caries of the teeth 12·07. There is also a small excess in nervous and mental diseases and in those of the circulatory system.

Making the comparison with the Colonial troops, the Regulars and Volunteers show an excess in the total admission-rate of 226·06 per 1,000, made up as follows: climatic disease 113·31, other general diseases 18·97, local diseases 93·78.

Among the local diseases the important differences are again

found to occur in diseases of the digestive system, 65·66 per 1,000, where the factors are again diarrhœa 17·16, sore throat and tonsillitis 9·21, and caries of the teeth 10·10. Subsidiary causes are: the circulatory system 12·09, nervous and mental disease 4·24, and venereal disease 6·14 per 1,000.

It is obvious from the above statements that the more important causes of the differences in the total admission-rates are, with one exception, comparatively trivial diseases. The exception is, of course, epidemic disease, which here again is seen to be predominant (see p. 394, vol. xv., *et seq.*). But if the question of the provision of hospital accommodation be considered, or that of temporary inefficiency, it is quite evident that the greater the proportion of an army in the field which is drawn from the civil population of Great Britain, either as specially enlisted corps without any previous training, or in a force which is not maintained constantly under training and observation at home and abroad, the greater will be the demand for hospital accommodation, and the greater the temporary inefficiency.

It is, unfortunately, of little use to attempt to ascertain how the permanent loss, other than by death, was distributed. The opportunities for sending men home were so frequent that invaliding was carried out largely as a means of dealing with temporary inefficiency, and preventing an undue accumulation of sick in the hospitals: it is therefore not a true measure of this loss (see Report on the Medical Arrangements, p. 209). But it is well established that under all conditions there is a constant elimination of the less fit which, usually spread over the first five years of service, is in war accelerated by the stresses of the campaign. The proportion of permanent loss under this head will always be greater in units of the types spoken of above, than in those of the Regular Army, because this process of elimination practically only begins when these units take the field.

INCINERATION OF HUMAN EXCRETA: FURTHER OBSERVATIONS.

By Lieutenant-Colonel BRUCE SKINNER, M.V.O.
Royal Army Medical Corps.

The method of disposal of excreta by incineration is being extensively employed in India, and the system illustrated in the Journal of the Royal Army Medical Corps (vol. xii., p. 443) in an article on the "Sialkot Incinerator" is the one which has afforded the cheapest and most satisfactory solution of the problem in this country.

As long as incineration is carried out accurately on the lines there sketched it effectually disposes of all the excreta, liquid and solid; but, like all processes involving care, rigid supervision over the Indian workmen is a *sine qua non*. Any relaxation of vigilance or neglect to punish a fault conduces to carelessness and bad results. India is not a country where one touches a button and the machine does the rest. It is a country without machinery, and dependent, in the execution of sanitary matters, upon a type of humanity which has not advanced within historic times.

Whether incineration be the accepted mode of disposal, or trenching, every detail of the scavenger's work must be watched, though in this respect supervision is easier with incineration, because the work is focused. One has not to watch for Crowly carts dropping filth along the roads while the sweeper sits on the cart singing, or empties a load of urine in a ditch in some secluded spot.

Whether incineration be employed or the dry-earth system, the first essential is to keep flies away from latrine pans. This can only be effected by removing ordure as soon as deposited, either into a covered receptacle or into a fire. Even when antiseptics are used in the pans flies swarm about them if this is not systematically done. The presence of flies in any large numbers discloses the fact that latrine sweepers do not remove the excreta promptly from the latrine pans. Antiseptics deluged over latrine walls, seats and pans, in anticipation of an inspector's visit, will not drive away flies which have settled in a locality where excreta are ordinarily available during the greater part of the day.

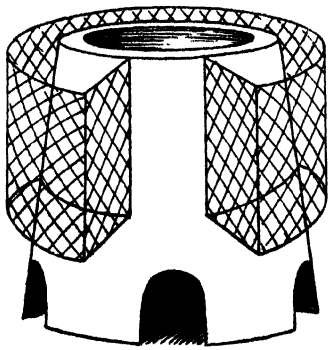
The first principle, then, in all latrine management is the prompt removal of the excreta into a receptacle or fire where flies cannot approach their pabulum and breeding-ground.

Where incineration is employed, the next point is to see that the fuel does not afford opportunity for flies to breed.

When litter supplied for incineration is in a damp, putrescent condition, it attracts flies, which deposit their eggs in it. And when such manure is heaped upon the ground the larvæ of flies may have time to burrow into the earth below, and in due course may produce fresh crops of flies.

If such manure be placed on an iron grating raised about a foot above the ground, the fly larvæ will be found dropping upon the ground. They should be swept up and burnt. An impervious floor should be made, or a sheet of iron or other material should be placed below, to prevent larvæ getting access to the soil, wherever manure is stored, whether stored on a grating or not.

The following diagram represents a device which enables the larvæ to be collected and the litter to be rapidly dried. It consists of a cage placed around seven-eights of the circumference of a mud incinerator, the gap being left for access to the fire by the sweeper. The bottom of the cage is 1 ft. from the ground. It has been found by following the above practice that litter supplied from cavalry lines does not conduce to fly-breeding, being usually too dry. That supplied from bazaar stables in a rotten condition acts as a breeding-ground, and, unless treated as above indicated, may lead to fly propagation.



INCINERATOR, WITH CAGE FOR LITTER.

As incineration of latrine stuff leads to the destruction by fire of all the available stable manure in a station, its final result must be the reduction of the fly pest to a minimum. But unless sweepers are careful and prompt to empty latrine pans, the presence of

exposed ordure will always attract flies to the site where it is least desirable they should be found, and this whatever system of conservancy, except the water-closet, is in vogue. The only fuel which should be stored against wet weather is dried leaves and grass.

For the information of those who have not been in India it may be added that a latrine consists essentially of a pan for the reception of excreta, over which the European sits and the Indian squats. For the former seats are provided; for the latter, stands. Each pan contains cresol solution. Although kerosine oil is not an antiseptic, it would be more valuable than cresol in pans because flies will not go near kerosine,[1] whereas they will not avoid cresol if it contains fæcal substance, more particularly when these float upon the cresol solution. As long as flies can get into fæcal masses they are liable to spread disease.

[1] For this reason kerosine oil is valuable for use in sputum-cups; also, it does not alter the appearance of the sputum.

MALARIA AT NASIRABAD.

By Lieutenant-Colonel J. S. GREEN.
Royal Army Medical Corps.

Owing to recent improvements in sanitation the incidence of most tropical diseases has much diminished, but malarial fevers still cause marked inefficiency amongst the troops and grave and lasting after-effects.

It is hoped that the following note on malaria at Nasirabad, Rajputana, may prove of interest :—

During the years 1903-1907 Nasirabad was among the ten most malarious stations in India (Army Medical Department Report for 1907, p. 91), and it was the second station on the list in 1903 and 1907.

The admission-rate per 1,000 (omitting decimals) was 586 in 1906, 511 in 1907, and 530 in 1908.

The prevalence of malarial fever at Nasirabad corresponds to a considerable extent with the rainfall. In the years of slight rain there has been little malaria, but when the rainfall was large the malarial fever largely increased.

For purposes of comparison the malarial year must be counted from July to June inclusive, in order to see the true effects of the rainfall on the incidence of the disease, as after a bad season the admissions for malaria continue during the spring of the following year. This is clearly shown in the chart, which gives the admissions and the rainfall for the periods July to December and January to June for the last ten years.

The table gives admissions for malaria by months for the last eleven years, together with the annual rainfall.

The normal rainfall is 19·58 inches. This year (1909) the rainfall has been over 31 inches, making the problem of combating malaria a difficult one ; but strenuous efforts were made by all concerned to reduce the incidence as far as possible.

The 1st Battalion King's Liverpool Regiment, which was saturated with malaria, having been in Nasirabad for three years and previously in Rangoon, left for England on January 12th, and was relieved by the 1st Battalion Durham Light Infantry, which arrived from Lucknow on January 11th, and was comparatively free from malaria.

This year (1909) there have been 134 admissions to hospital—137 per 1,000.

All cases shown as malaria were diagnosed by the microscope. In most of the cases the benign tertian parasite was found, but in about 10 per cent. the malignant tertian parasite was present.

Some of the cases were "re-admissions." Other cases of fever in which the malarial parasite was not found were shown as "pyrexia of uncertain origin," and amounted to 51, or a total of 185 admissions for fever.

A.—Conditions favourable to the Propagation of the Disease.

(*a*) Proximity of a large town, (22,000 inhabitants), called the Sudder bazaar, and the close proximity of the artillery sais lines and British Infantry bazaar to the lines occupied by the British troops.

(*b*) Prevalence of carriers of infection, and presence of many suitable breeding-places for Anopheles mosquitoes.

Culex mosquitoes were present in considerable numbers during the cold weather and hot season, but very few Anopheles were then found. Anopheles mosquitoes, chiefly *Pseudo-myzomyia rossii*, *Myzomyia culifacies*, and *Nyssorhynchus stephensii*, were observed after the first monsoon rains, and later on Anopheles larvæ were to be found in almost any shallow collection of water.

The prevailing wind blows from the west, and there is a large quarry about 300 yards west of the Royal Field Artillery lines, in which about twenty separate pools of water form after rain. This quarry is a serious problem, owing to its close proximity to barracks. A large nulla also runs west of the parade-ground, in which, owing to its irregular levels and tortuous course, pools form after each shower of rain, and these cannot be drained away. West of this nulla are three large tanks. There are "diggis," or deep pits, from which earth has been excavated for building purposes, between the officers' bungalows and the Sudder bazaar. These "diggis" get full of water during heavy rain, and when the water subsides mosquitoes breed freely in them.

There are four other large tanks to the east of the officers' bungalows and near the bazaar. One of these is used for watering cattle, and the sloping banks are covered with hoof-marks containing water, in which mosquitoes breed.

The drainage in the cantonment proper is indifferent. There are no pukka drains, and after heavy rain the place is flooded. In 1908, 4 inches of rain fell on June 19th, and in 1909, 5½ inches on July 14th. Fortunately the soil rapidly absorbs water. The drainage in the Sudder bazaar is bad; also in every house and compound in the bazaar there are numerous chatties and other vessels containing water. On the outskirts of the cantonments are several

other quarries and nullas, also borrow pits along the railway and broken jungle ground.

B.—Measures which have been carried out this Year.

(*a*) *Attack on the Larval Mosquito in its Breeding-ground.*—The cantonment was divided up into sections, officers commanding units each having their section.

Strong fatigue parties of British and native troops have been employed during the monsoon season in filling holes and improving drains and nullas, so as to allow the water to run off. In this work all units willingly co-operated.

Station orders were issued directing all waste-water receptacles to be completely emptied once a week; all pots, chatties, tins, &c., when not in use, to be kept empty and placed upside down; and all long grass, weeds, &c., to be removed.

An inspection was made every Saturday morning by each bungalow occupier or his representative of all servants' quarters &c., to see that all water receptacles were empty.

A similar inspection was made every Saturday of all saises and followers' lines in barracks.

Wells not in use were covered in with stone slabs, other wells were treated with half a pint of kerosine oil every Saturday afternoon, and no water was drawn off until the following morning. The "bullock runs" of wells which became full of water during the rains were bailed out by the troops.

"Tatties" are much used in the station during the hot weather, and there are catch-pits for the water near each tattie; these pits were filled in with stones and sand, and will be kept filled till next hot weather.

The water from bathrooms was formerly run to the roots of trees, and there formed stagnant pools. This bathroom water is now run into gardens in the open, planted with guinea grass and canna.

Deep tanks and quarries were kept stocked with small fish, a large number having been put in during the autumn; the fish proved very effective in destroying mosquito larvæ.

These operations were carried out by the N.C.O.'s and men trained in sanitation, under the direction of the medical officer in charge of the unit.

No collection of water can be neglected; larvæ were found in myriads in the water tubs near the guns inside the artillery gun-park, also in chatties and broken vessels on the flat roofs of houses. The garden tanks in the church compounds and in the cemetery

were favourite breeding-grounds, also the swimming bath and its accessory tanks.

Lectures were given to the troops on malaria and its connection with mosquitoes, and also practical demonstrations on the life-history of the mosquito.

A native sub-committee in the bazaar has been instructing the people to allow "no stagnant water."

(*b*) *Defence against Adult Mosquitoes.*—Mosquito curtains were provided from regimental funds by the 12th Battery Royal Field Artillery and Durham Light Infantry. The nets were taken into use at the beginning of July, when the punkas were stopped at the commencement of the rains. The men themselves paid half the cost of the curtains, the remainder being paid out of regimental funds.

The Durham Light Infantry obtained their nets at a cost of 3·8 rupees each, landed at Nasirabad railway station; the curtains were 6½ feet long, 2½ feet wide, 3½ feet deep, with a calico top and calico border, having a depth of 1½ feet at the bottom. These dimensions might very well be increased to 3 feet wide and 4 feet deep, to allow a freer circulation of air. The poles were of bamboo, and were obtained locally at a cost of four annas. The nets were hung inside the poles, and tucked in under the mattress at night. An inspection was made before dusk to see that no mosquitoes had got inside the net, and all holes in the netting were at once repaired. The curtains were most useful in preventing infection, and all men should certainly be provided with them, and also with sleeping suits; but constant care and attention is required in the management and use of the curtains.

The use of "shorts" was discontinued to minimise the risk of bites.

(*c*) *The Segregation of Malarial Patients and their Protection from Adult Insects.*—All malarial patients in hospital were kept in separate wards, provided with wire gauze doors and windows and were under mosquito curtains, twenty extra nets having been obtained in addition to the 25 per cent. allowed for hospitals in the plains.

It is considered that in malarious stations in the plains all the beds should be so equipped.

Chronic cases and those in which the malignant tertian parasite was found were sent to the hills, and were kept there until the malarial season was over at the end of November.

(*d*) *The Atack on the Malarial Parasite in the Blood.*—Prophy-

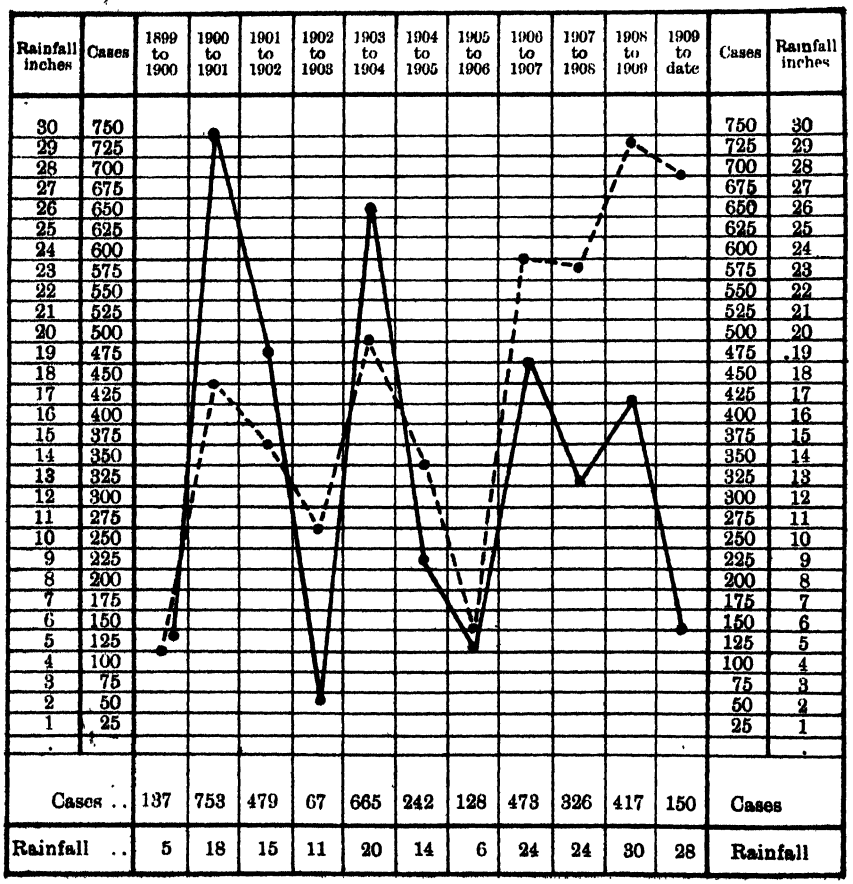
lactic doses of quinine were given from the middle of July to the end of November to all troops, British and native; also to all followers, public and private, and to the native children in regimental lines. Ten grains were given twice a week to adults on two successive days under proper supervision.

The routine treatment adopted in cases of malarial fever was to give 30 grains of quinine daily for five days, and then 15 grains daily for another week, and afterwards 10 grains twice weekly on two successive days for another three or four months.

In malignant cases intramuscular injections of quinine bihydrochloride (8 grains) were found most effective.

CHART TO SHOW RELATION OF MALARIA TO RAINFALL AT NASIRABAD DURING THE PERIODS JULY TO JUNE, INCLUSIVE.

——— Cases of malaria. - - - - - Rainfall inches.



Rainfall inches	Cases	1899 to 1900	1900 to 1901	1901 to 1902	1902 to 1903	1903 to 1904	1904 to 1905	1905 to 1906	1906 to 1907	1907 to 1908	1908 to 1909	1909 to date	Cases	Rainfall inches
30	750												750	30
29	725												725	29
28	700												700	28
27	675												675	27
26	650												650	26
25	625												625	25
24	600												600	24
23	575												575	23
22	550												550	22
21	525												525	21
20	500												500	20
19	475												475	19
18	450												450	18
17	425												425	17
16	400												400	16
15	375												375	15
14	350												350	14
13	325												325	13
12	300												300	12
11	275												275	11
10	250												250	10
9	225												225	9
8	200												200	8
7	175												175	7
6	150												150	6
5	125												125	5
4	100												100	4
3	75												75	3
2	50												50	2
1	25												25	1
Cases ..		137	753	479	67	665	242	128	473	326	417	150	Cases	
Rainfall ..		5	18	15	11	20	14	6	24	24	30	28	Rainfall	

TABLE SHOWING ADMISSIONS FOR MALARIA BY MONTHS, FROM 1899 TO 1909.

Month	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909
January.. ..	5	6	60	14	..	46	15	6	21	7	7
February ..	5	6	50	7	..	27	14	..	9	6	4
March	12	17	42	13	3	19	11	6	7	1	8
April	8	8	52	20	3	28	12	4	15	6	5
May	13	11	37	7	1	43	5	20	20	12	2
June	16	24	33	11	2	27	12	4	38	7	2
July	12	15	27	5	..	28	9	11	35	7	7
August	14	11	45	8	9	34	13	11	46	27	18
September ..	9	66	100	10	67	50	9	91	83	98	27
October	11	227	140	16	149	25	9	81	68	160	28
November ..	10	102	72	11	178	17	31	106	42	76	15
December ..	9	58	23	8	72	19	7	63	13	21	11
Total	124	551	681	130	484	367	147	403	397	428	134
Average annual strength	838	781	681	370	673	780	926	688	781	808	977
Ratio per 1,000, decimals omitted	148	705	1,000	351	719	465	174	586	511	530	137
Rainfall, inches	7·55	16·40	18·60	10·96	17·97	15·79	4·58	21·95	22·98	30·34	31·19

Corps:	Royal Fusiliers	Connaught Rangers	York and Lancaster	Seaforth Highlanders	King's Liverpool Regiment	Durham Light Infantry
Arrival at station ..	20.4.98	20.3.01	19.4.02	20.2.03	25.10.05	11.1.09
Departure from station	21.3.01	22.4.02	19.1.03	27.11.05	13.1.09	—

United Services Medical Society.

MALINGERING.

By Major C. E. POLLOCK.
Royal Army Medical Corps.

Introduction.—The malingerer, both in civil and military life, affords the medical man a most interesting and at times annoying study. The man who for any purpose feigns disease engages in a contest of wits with the doctor, and this fact should appeal to our sporting instincts; we must also remember that in most cases the fraud can only be detected by careful observation. Now, observation followed by correct deduction is the basis of all clinical medicine. We should therefore welcome the malingerer who, as it were, takes us on a staff ride in clinical observation.

If a medical officer is successfully humbugged by a malingerer, he not only loses in reputation and respect but will find his work greatly increased by the advent of a host of imitators; for if one man successfully evades an unpleasant duty by "stuffing" the doctor, other unscrupulous men will naturally argue that they are quite entitled to do the same. If, on the other hand, the medical officer detects Thomas Atkins' little game, and either hands him over to his Commanding Officer to be dealt with or privately takes revenge by administering vile concoctions, to the preparation of which our pharmacopœia readily lends itself, all the other men in the company will rejoice at Thomas's downfall, and will not fail to remind him of it.

Let me, however, impress on junior medical officers who are beginning an Army career that they must never jump to the conclusion that any man is malingering till they have exhausted every scientific method of investigation and *recorded* the results. If there is any doubt as to the genuineness of the man's illness, let him have the benefit of it; it is wiser to be "had" occasionally by some past-master in simulation rather than to be the means of unjustly punishing one innocent man. Also do not send up a court-martial charge under Section 18 of the Army Act unless you are quite sure of your facts, and are prepared to clear up any doubtful point which may be raised by any member of the court. A failure to convict tends to discredit the medical officer with both the soldier and his officer.

Definition.—For those interested in military law a study of Section 18 of the Army Act is to be recommended. In this Section the various conditions generally included under "malingering" are separately defined. As, however, we are not dealing with the legal aspects of malingering, I will proceed to discuss some of the many ways in which soldiers of different armies, and at different times, have tried to outwit the doctor.

The times at which malingering is attempted differ somewhat in the British and Continental armies, owing to the different conditions of enlistment. In our Army, enlistment being voluntary, or at least strongly desired by the recruit to suit his own convenience at that particular time, we do not meet with malingerers when examining recruits; we may of course, and often do, have to deal with the opposite condition—namely concealment of disease—but this is outside our scope for this evening. In Continental armies, however, enlistment is compulsory, and among the recruits called up for service there are always a few who, from motives of unselfishness, would prefer to leave the glory of soldiering to others. The simplest method of evading their national obligations is to be found medically unfit. Demand creates supply, hence there are in many of the larger cities specialists who, in return for a consideration, engage to get these men freed from their obligation to serve in the army, while not seriously interfering with their capacity for earning a livelihood as private citizens.

This is especially so in Russia. In the Russian Army Medical Service there is a class of superior non-commissioned officer called a feldsher, who receives some medical training and acts as a dresser to the medical officer; he is thus thoroughly conversant with army routine and requirements. When he leaves the army he engages in some form of civilian practice. A lucrative branch to take up is that of recruits' friend. When consulted by an anti-militarist recruit the feldsher apparently makes a careful examination to determine if Nature has left any weak spots in his anatomy which with a little assistance would cause the recruit's rejection as unfit for the army. Many of the tricks which I hope to mention shortly have been evolved and perfected by the feldsher.

Motives for Malingering.—Taken in its widest sense the principal motives for malingering are:—

(1) To evade some unpleasant duty.

(2) In order to get admitted into hospital and have an easy time; this applies especially to men undergoing detention.

(3) Home-sickness. Soldiers abroad are sometimes attacked

by a longing to get home, and will do anything to attain their object.

(4) To get out of the Service.

(5) In order to obtain compensation for some injury by exaggerating its effects.

Classification.—The phenomena met with in malingering are so varied that it is extremely difficult to classify them in any kind of order. I have followed the classification introduced by Beaupre in his book published in 1822, which is as follows:—

(1) Conditions dependent on the man's own will.

(2) Conditions induced by artificial means with or without alterations in the tissues.

I.—Conditions Dependent on the Man's own Will.

This group embraces the conditions with which medical officers of the British Army most often have to deal.

Mental Disease.—The most important, and at the same time most troublesome, condition which any soldier may elect to simulate is undoubtedly mental disease in any of its forms. It is especially when serving abroad that a man may become thoroughly "fed up" with Army life, and filled with a longing to revisit his old haunts at home. He knows perfectly well that he will not be sent home except for some serious disability. The easiest way out of the difficulty is to "sham mad." The particular form of madness which he may elect to simulate is often a matter of chance. He may decide to copy someone whom he has known or heard of who has successfully "worked his ticket," or he may have read some fantastic description of the behaviour of some insane person, or, again, he may rely on his imagination. In the latter case he generally over-acts the part and is easily detected. When, however, we have to deal with a morbid nervous individual who has made up his mind to get home somehow, and is nursing a grievance against everything and everybody, it is by no means always easy for a medical officer, who has not specialised in mental disease, to say whether he is dealing with a pure malingerer, or a patient on the border-line of insanity. In forming a diagnosis we are largely dependent on the reports of his attendants. In India there are, or at least in my time there were, no trained mental attendants. An unarmed guard, changed daily, was mounted over the inmates of the observation ward. As a part of their duties a written report of the patients' behaviour during the twenty-four hours had to be furnished next morning to the medical officer in

charge of the case. This report usually contained a record of the patient's meals, ablutions, &c., but, as far as furnishing any observations on which the medical officer might base his diagnosis, it was utterly useless. I fancy that the sympathies of the men on guard are usually on the side of the malingerer, and that, unless the patient is foolish enough to disturb their slumbers at night or make an unwarranted attack on them, they do not consider it sporting to give the man away, and so give the doctor an unfair advantage in the contest of wits.

Reports from the man's comrades in barracks are usually equally useless, merely containing generalities to the effect that "he acted queer" on such and such an occasion.

If the man is really determined in his efforts to get home, and he is discharged N.A.D. by the medical officer, he may do something really foolish, such as discharge a rifle in a barrack-room while threatening his own life or someone else's. In a case of this sort the medical officer must either send the man for trial as a malingerer or send him home as an insane, according to the facts of the particular case. When coming home from India on a troopship it is astonishing to note how rapid an improvement sets in, in at least 80 per cent. of the insane, when once the ship has started for home.

One sportsman in Peshawar succeeded in persuading the Medical Board that he was entitled to an indulgence passage home as an insane, variety melancholia, with acute depression and obstinate silence. He was duly escorted to the station and placed in the train, still silent and melancholic, under escort of an assistant surgeon and two attendants. As the train steamed slowly out of the station he felt safe, so leaning out of the carriage window he waved his hand to the medical officer and shouted a jeering farewell, at the same time desiring that some insulting message be conveyed to the members of the Medical Board for having been taken in by him. This man, however, had forgotten the existence of the telegraph, and was somewhat disconcerted on being met by a fresh escort at Rawal Pindi, where he was replaced in hospital for further examination, and, instead of getting a trip to England, was given a change to the hills in a place called Dagshai, where His Majesty keeps a hospice for duly accredited persons belonging to the Army.

In one station in which I had the honour of serving, the senior medical officer particularly disliked mental malingerers, whom he regarded as mean sneaks who caused a lot of trouble and worry to many other people in order to gain their own selfish ends. Being

pretty shrewd, he generally recognised any attempt at simulation, and made it a rule to send up charges of malingering against them, which resulted in a sentence of at least six months' imprisonment with hard labour. This plan, as he reported offically, had a very deterrent effect on would-be insanes. In another station a different senior medical officer received every malingerer with open arms, and demanded a separate guard for each. This was so highly appreciated by the loafers of the regiment that in a short time he had collected some thirty pseudo-insanes, who were guarded by one and a half companies out of the regiment in garrison. The senior medical officer, however, soon received an invitation to confer with higher authority on the subject, and got so little sympathy himself that he hardened his heart and refused to listen to any more ingenious tales.

What is really wanted in India is a central establishment properly fitted up for the treatment of mental cases, and placed under the charge of a specialist in mental diseases, assisted by a trained staff. Any man showing signs of insanity, and in whose case there is any doubt as to the genuineness of the disease, should be sent there under observation till a definite diagnosis has been formed. Any man found to be simulating insanity should be very severely dealt with, on account of the trouble and expense which such an attempt involves. Every mental case must be taken seriously, whether malingering or not. Action taken by a medical officer in consequence of a hastily formed conclusion as to the nature of the complaint may be followed by some desperate act on the part of the patient, which may in turn have somewhat unpleasant and far-reaching effects on the officer's career. Such cases have occurred.

Fits.—Another great source of trouble to the medical officer is feigned fits. This form of malingering dates back to ancient times. Ambroise Paré detected soldiers chewing soap in order to simulate epilepsy. Of recent years the soldier who shams fits appears to have given up the use of soap froth; at all events, I have never seen a case of this kind. One shrewd physician about the year 1817 remarked in the presence of a malingering epileptic that genuine epileptic fits only occurred in the morning. Hearing this, the man restricted his fits to the morning, and was thus detected.

In one military hospital, where sham fits were becoming uncomfortably numerous, the plan was adopted of placing a bucket of cold water at the foot of the patient's bed and giving instructions that on the first sign of a fit anyone in the ward was to empty the

bucket over the patient's head first and only then to send for the medical officer. The majority of the men speedily recovered, and deprived their fellow-patients of an expected pleasure.

Out of many hundreds of sham epileptics placed in hospital under observation I have never known one have the audacity to sham a fit when the medical officer has been present. They always select the time when the least experienced orderly is on duty, and, as you all know, they never hurt themselves. Still, every case of fits is not necessarily a malingerer, and let me repeat that we must not jump to this conclusion till we have some definite reason for doing so.

The alcoholic-hysterical-pseudo-epileptic fit is a case in point. I have not the slightest doubt but that men who suffer from this kind of attack could perfectly well prevent it coming on if they really tried to stop it; still they do not do so, and yet we can hardly call them malingerers. I remember one man being carried to hospital at 1 a.m. by six sympathetic comrades during a tropical downpour of rain. The medical officer on duty, being called out of bed at this hour, and being a bit of a hard nut himself with no sympathy for nervy people, proceeded to apply vigorous mechanical stimulation, under which treatment the man rapidly recovered control of himself, whereupon he was made to march back to barracks carrying his stretcher while his comrades continued the medical officer's treatment.

Other spurious affections of the nervous system are headaches, giddiness, dizziness, with which we may, for practical purposes, include diarrhœa, vomiting, &c. These are only mild troubles, usually pleaded in order to evade some unpleasant duty. If the medical officer feels convinced that the man is humbugging, he can be very sympathetic and at the same time prescribe some nauseous nerve stimulant. Many excellent formulæ for Mist. Diaboli have at different times been introduced. A useful all-round one is the following:—

Ol. morrhuæ		℥i.
Tr. ferri perchlor.		ɱx.
Tr. assafœtida		ʒss.
Ol. menth. pip.		ɱv.
Aq.		ad. ℥ii.

Then sprinkle quin. sulph., gr. x., in powder on the top of the draught before the poor sufferer swallows it. The tonic effect is so good that few men ask for a second dose.

Diseases of the Special Senses.

Hearing.—Complete deafness is not a favourite disease among malingerers, probably because when thoroughly carried out it makes the man's life in hospital somewhat dull, as he cannot converse freely with his fellow-patients. In such cases when a careful examination fails to reveal any cause for the supposed malady, we have to obtain reports from his attendants as to his behaviour when he thinks that no orderly or medical officer is about. An old ruse is to watch for a favourable opportunity when the man is standing on a stone or other hard floor looking away from the observer, and let a coin fall close behind him. No one who unexpectedly hears the ring of a coin striking the ground can resist turning round to pick it up.

The German plans mentioned by Captain Balck in the November number of the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS are very good too. One of these consists in having two rubber corks apparently precisely the same, but one of which is perforated and the other is solid. The solid one is shown to the recruit and you tell him that you are going to put it in his sound ear before testing the deaf one, but without his knowing it you substitute the perforated one and proceed to test his hearing by whispering. If he says he cannot hear anything you know that he is lying. Then substitute the solid cork and try him again; if he now hears it must be with the deaf ear.

The other plan is to place a paper funnel in each ear and get two people to whisper to him at once; then ask him to repeat any words he has heard. If he repeats a single word which was whispered into the deaf ear, he must have heard it with that ear.

Vision.—Feigned defects of vision are always most troublesome to detect; they occur in small epidemics when the musketry season commences. Any man who fails to make a decent score usually attributes it to defective vision, instead of to beer or stupidity, and is promptly sent to hospital for examination. In stations which are fortunate enough to possess a specialist in ophthalmology, the truth of the man's statement can easily be verified or otherwise, but the medical officer in camp has to depend on some one of the many dodges for detecting malingerers.

One of the oldest of these is to make the man read the types as far as you can, and then if he pleads short sight put on a -2 lens and get him to read a bit more; next put $+2$ over the first lens so as to neutralise it and try to get him to read further. If he does so he must be a malingerer. A French surgeon has suggested that the

types should be printed as single letters, one on each face of a cube, and that they should be shown one at a time rapidly to the man and not in any definite order. In this way the man has not time to consider how much he intends to read, and may thus be detected.

Balck mentions two methods employed in Germany when examining recruits. In one the man is asked to read the types as far as he can; a mirror is then placed opposite him and a set of reversed types alongside him, and he is asked to read them again. If he reads them just as far as before he must be malingering as the distance is now double what it was.

For unilateral defective vision hold a solid stethoscope about four inches in front of the man, and ask him to read some printed matter; if he can do so with ease he is using both eyes.

In the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS for October, 1909, Bishop Harman has contributed a valuable article on testing unilateral vision. He employs a simple instrument, but which can be roughly improvised by making a hole ½ inch square in a piece of paper. This paper is held about a foot from the man's eyes and about four inches from a paper on which the numerals from one to nine are distinctly written, and which he is told to read. The effect of the diaphragm, is that the man sees by crossed vision, the right eye seeing the left half of the paper and *vice versa*. If the man can read the whole line he must be using both eyes.

The Italians have another test which consists of an oblong box, in which are concealed two crossed tubes so that the right eye can only see what appears to be placed opposite the left eye and *vice versa*, although the person being examined does not know this. The opening apparently opposite the defective eye is closed, and you tell the man that you are going to test the sound eye. A test card is placed opposite the sound eye and he is asked to read it; if he does so he is using the defective eye.

There is another old test dependent on the fact that a red glass neutralises a green colour and renders it invisible. On a test card you have FRIEND printed in large type, the F I N being in green and the R E D being in red type. A red glass is placed over the sound eye and a green one over the defective eye, and the man is asked to read the word. If he reads the whole word he must be using the defective eye, as the sound one can only see the R E D in red type.

Taste.—Defective taste is not, so far as I am aware, ever complained of by a malingerer as it would not lead to any privileges.

Speech.—Dumbness or a high degree of hoarseness is occa-

sionally simulated. In such cases a sudden pain, *e.g.*, when examining the man a sharp pin-prick or a galvanic shock may restore the lost power of speech; a bucket of cold water suddenly thrown over the man when in a hot bath has also been known to draw a forcible expression of his opinions. There is also the venerable practice of saying in the man's presence that he must be fed up with plenty of good food and accordingly filling up his diet sheet with a number of tasty extras, but in reality only allowing a plain milk or beef-tea diet. Each morning the orderly is asked whether the patient got all his extras and how he liked them. If the orderly plays up well he can give detailed descriptions as to how the man enjoyed the various dishes. After a few days the man, goaded by a healthy appetite and hearing of his supposed feasts, may be sufficiently wrought up to consign the orderly to a warmer climate.

Should these plans fail one may fall back on a mock consultation. The man must be placed in a small ward by himself. Another medical officer, having been instructed beforehand as to the part he is to play, is called in and a consultation is held over the case in which the necessity for an operation and the extremely risky nature of it are freely dilated on. A point must be made of the fact that the Senior Medical Officer would never consent to such a risky proceeding and that therefore they had better carry out the operation in the patient's bed and if he dies say that the case was too urgent to wait. A few surgical instruments, but especially a large amputating knife, must then be brought into the room and everything got ready as if for an operation. A towel on which a drop or two of chloroform has been placed is held just near enough to the man's face to let him smell the chloroform; the other medical officer in the mean time rattles the instruments and asks when he may begin, &c. This plan was so successful in one case of alleged dumbness that the man bolted, shouting for mercy, and was not found for three days.

A mild degree of anæsthesia will inhibit the man's self-control and generally cause a free flow of those forcible expressions with which we are so well acquainted.

Voluntary Starvation.—Voluntary starvation is not, so far as I am aware, commonly met with among soldiers. An example of this was, however, recently reported by a French army surgeon. A number of men belonging to a certain infantry regiment reported sick at frequent intervals, complaining of lassitude and occasional diarrhœa. They were carefully examined for tubercle and other

diseases, but the only unusual condition which could be detected was a progressive loss of weight and intermittent diarrhœa. When watched, however, it was found that these men were deliberately refusing to eat their food and were dosing themselves with sulphate of magnesium in the early morning.

Fever.—Pyrexia has been simulated by manipulating the thermometer. By vigorously rubbing the bulb on a blanket or other rough surface a high temperature can undoubtedly be registered. Another reputed plan for obtaining this end is to squeeze the bulb and so force the mercury up the stem. I have tried this many times, but never succeeded in raising the column of mercury. A crude method is to dip the bulb into hot tea or hold it to the fire. One of the neatest ways is to fill the mouth with very hot water and hold it there for a time, some minutes before the temperature is taken; if the man keeps his mouth shut till he receives the thermometer a high temperature will be registered.

Pains.—Obscure pains in the joints and limbs may be complained of and we have at present no scientific test for these. If, however, there is fairly good reason to suppose that the pains are not genuine it is worth remembering that blisters may be made very painful and yet constitute good treatment for arthralgia.

We must not, however, jump to the conclusion that the pains are spurious although the circumstances may arouse our suspicion as to the genuineness of the complaint. As an illustration of this, I may mention the case of a soldier who always complained of severe pain just under the ball of the great toe when doing a route march but not at other times. The country was uninteresting, and viewed from the ranks while carrying full marching order it did not gain in attractiveness, and one might with good reason have supposed that this man merely wished to evade route marches. An X-ray picture, however, revealed the existence of a pointed exostosis growing from the under surface of the head of the first metatarsal bone; this was removed and the complaint ceased.

II.—Conditions Induced or Simulated by Artificial Means with or without Alteration of the Tissues.

Hæmoptysis, Hæmatemesis, Melæna.—Formerly, when men desired a prolonged rest in hospital they not uncommonly simulated one of the above conditions, but especially the first one. Having gained admission to hospital, the man awaited the time of the surgeon's visit, and then by making a minute laceration in the mucous membranes of the mouth at some spot not likely to attract

attention he sucked out a small quantity of blood and churned this up with saliva; he then indulged in a prolonged fit of coughing at the end of which he expectorated the blood-stained frothy mucus. Sometimes powdered brick-dust, or a dye, such as logwood or cochineal, was mixed with the saliva. The microscope and our increased knowledge of phthisis have, however, played havoc with this little game.

In some cases reported from the Continent the man has obtained animal blood (fresh supplies being conveyed to him at intervals in bottles by a confederate), and mixed this with his stools or, as happened in one case, the man used to swallow it and then vomit it up again.

Œdema.—Œdema has been produced in limbs by tying an elastic band high up round the limb and leaving it for the night, but removing it some time before the medical officer's visit; a trace of the constriction will generally be found if looked for. Attempts have been made to slow the pulse by compressing the artery higher up or by placing some foreign body in the sleeve of the garment so that the limb can be pressed against it.

Jaundice.—One of the neatest and easiest tricks to play on a medical officer is to take one and perhaps a second capsule containing 5 grains of picric acid. In from six to twelve hours a typical jaundice appears which lasts for one or two weeks. The stools, however, still retain their colour, and the urine will give the reaction for picric acid.

Drug Rashes.—As you know, many drugs will produce a rash, although I do not think that our men take drugs for the purpose of producing a rash. The scarlatiniform rash of copaiba is commonly met with in men who are trying to treat themselves out of hospital for a very common complaint.

Diphtheritic membrane may be simulated by blowing powdered cantharides on to the tonsils.

Spurious Dislocations.—Some men are what is popularly called double-jointed, and can produce genuine sub-luxations of one of their joints whenever they please. Unless the medical officer happens to know the man's history he cannot say that the man is malingering, as all the classical signs of the lesion are present.

Palpitation.—As everyone knows, this is one of the most troublesome diseases which we have to deal with in the Army. I am sure that it can be induced by artificial means, but have never succeeded in finding out just how it is induced. Chewing tobacco in the early morning and swallowing the saliva is, I think, one of the ways.

Cases have been recorded from the Continent in which digitalis and other drugs have been taken to induce irregularity of the heart's action.

Emphysema.—Introducing air into the subcutaneous tissues has often been reported from the Continent. This may be done with a hypodermic needle and syringe, or more crudely by making an incision into the skin, inserting a straw and simply blowing in air. If a man reports that he has fallen on his side and is suffering from severe pain every time he breathes, and on examining him you find extensive emphysema, you naturally conclude that he has fractured a rib and injured his lung. In one case a man used to inflate his scrotum, which somewhat puzzled the medical officers until he was detected in the act. Another sportsman obtained possession of a catheter, with which he used to introduce air into his bladder, and was in consequence for a time believed to have a tuberculous fistula opening into the rectum.

Wounds.—Preventing wounds from healing by rubbing in irritants, or actual mechanical interference, has often been employed in order to prolong a stay in hospital. In one suspected case the surgeon applied the bandage himself and sealed its end in order to prevent the man from taking it off and getting at the wound. No improvement followed. The man was, however, caught in the act of poking at the wound by pushing a large needle through the folds of the bandage.

Mutilation.—The crudest and probably most ancient form of malingering is mutilation. With the old muzzle-loading musket the man had to bite off the end of the cartridge before loading; by extracting his incisor teeth he became unfit for service. Another simple method was to blow off the trigger finger of the right hand.

Of the more scientific methods one perfected by the Russian feldsher is to bend the toes forcibly downwards and fix them in this position with plaster of Paris bandages. If this practice is persevered with for some twelve months prior to enlistment the toes remain fixed in this position and of course the man cannot march. As soon as the man has been definitely released from service the feldsher sets to work to reverse the process. Another plan is to make a wound on the contiguous surfaces of the fingers and so obtain union between them. After rejection the fingers are again separated by operation.

Artificial Hernia.—If the man is found to have somewhat lax abdominal rings the feldsher takes an instrument somewhat like a glove-stretcher and forcibly dilates the rings till on any exertion

a hernia appears. This practice is now well known, and latterly the Russian authorities have given the man the option of undergoing a radical cure for hernia, or serving in the ranks just as he is. It is stated that an artificial hernia cannot be induced in a man with normal rings without using such extreme violence that no man could stand the pain.

Inflammation.—The *Caducée* reported an interesting occurrence in which French military prisoners who, being sent to a convalescent home, found this pleasanter than the prison and determined to prolong their stay by means of malingering. One of them succeeded in obtaining possession of a hypodermic syringe with which they injected a mixture of petrol and vegetable juices into the tissues of their thighs. The result somewhat exceeded their intentions, as very extensive phlegmonous inflammation was set up and in one case this led to wholesale sloughing of the tissues, with subsequent scar formation and contraction.

Ulcers.—The production of ulcers by applying irritants, caustics and actual fire is a very common practice amongst malingerers.

The Egyptian recruit was particularly addicted to introducing irritants or caustics into the conjunctival sac with the object of inducing severe conjunctivitis or even a corneal ulcer. Caustic fluids are even now often introduced into the external meatus with the object of exciting a purulent discharge or even perforation of the membrane.

Arsenical and lime pastes have been used to produce ulcers of the tissues. In one case, in addition to the ulcer, an extremely severe peripheral neuritis was set up.

Escharotics have also been applied to the mucous membranes of the genital organs in order to simulate venereal disease. One case of this came under my own notice. The man had spent some time in hospital awaiting trial by court-martial on a serious charge. When sent out to the guard-room he was especially carefully examined and marked fit for trial. On the morning of the actual trial he was brought up for examination again, and said he was quite fit. Knowing that he was a real "bad hat" I re-examined him and found two deep circular ulcers just beneath the corona of the glands. The appearance of these, together with his history, convinced me that he could not have acquired them in the orthodox way. I accordingly sent him back to hospital and added a charge under Section 18 to his original sheet. He subsequently confessed that he had borrowed a lighted cigarette from one of the men on guard, and pressed the burning end of this on to the mucous membrane.

Artificial Tumours.—The Russian feldsher keeps himself fairly up to date. When the injection of paraffin for the removal of deformities was introduced, the feldsher soon saw that it might be useful to him as, if by this procedure deficiencies could be hidden, deformities could also be produced. The plan was speedily tried and with considerable success at first. In one case, however, the aseptic precautions were faulty, and a chronic abscess formed, in the discharge from which small particles of paraffin were found. One case reported from Breslau was that of a man who had been excused service in Russia on account of a supposed sarcoma of the lower jaw. When he presented himself at the General Hospital, Breslau, to have the tumour removed, it was found to be about the size of a goose's egg, firmly adherent to the skin and surrounding tissues. It was removed with considerable difficulty, as the paraffin had apparently been introduced on several occasions and was intimately blended with the surrounding tissues.

The same method has also been used to produce apparent sarcomata of the testis and inguinal lymph glands. Now that the trick has become known all doubtful tumours are tested by applying a very hot bottle for half an hour; if the tumour becomes soft and pliable the man is considered fit for service.

Conclusion.—I have only had time to touch on a few of the many devices adopted by skrimshankers, and doubtless many officers present can add a great deal more from their own experience, which I hope they will do.

Let me once again ask the junior officers not to hastily conclude that a man is malingering because his symptoms do not fit in with their preconceived notions, but to thoroughly examine every case before making up their minds.

NOTES ON GUINEA-WORM IN THE SUDAN.

By Major S. L. CUMMINS.
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Filiaria medinensis, or "Guinea-worm," is a parasite capable of causing great loss of efficiency as well as suffering amongst garrisons stationed in endemic areas, and a discussion on the subject is therefore of interest to army medical officers.

Although natives are much more subject to the disease than Europeans, still the latter only escape it by avoiding the localities where it exists, or by taking precautions more elaborate than would be likely to obtain under Service conditions amongst the rank and file.

Should it ever become necessary for British troops to operate in Tropical Africa, the difficulty of water supply would involve the breaking up of columns into detachments, and the water discipline of detachments is usually bad. But apart from the question of British troops, a large number of our officers serve from time to time with native corps, and to them the question of "Guinea-worm" has a decided importance.

I do not propose to discuss the natural history of the parasite, which is well known to you all, beyond reminding you that the mode of entry of the embryo Guinea-worm into the human body is no longer a matter of doubt, this question having been definitely settled by the researches of Leiper.

That observer has definitely proved that the embryos, after a stage of a few weeks' duration in the body of the cyclops, are ingested, with their intermediate host, in drinking water, and enter the tissues through the stomach walls.

The males and females come together in the tissues about the mesentery (Castellani), and after connection the males die off while the impregnated females make their way towards the surface of the body, usually towards the lower extremity, where they give rise to the symptoms characteristic of the disease.

I return to the military aspects of the disease. From the strategical point of view its importance is greatly lessened by the fact that, after infection by the ingested parasite, a period of about a year elapses before the symptoms become manifest.

The disease is therefore of no immediate importance to a column operating in an infected district provided the duration of the military operations is less than twelve months. Garrisons, how-

ever, especially when composed of native troops, are likely to suffer very severely under certain conditions.

To illustrate this I may quote from my Annual Report on Medical Services in the Bahr-el-Ghazal for 1902.

"At Waw, where the garrison consisted of 100 men of the 10th Sudanese, and about 30 irregulars (Jehedieh), Guinea-worm was a perfect scourge *to those soldiers who had spent a previous year in the district,* although the detachment of the 10th Sudanese, who were newly arrived, did not suffer at all. There were, in all, 19 admissions to Waw Hospital. Of these 11 were from the irregulars, 7 from Sudanese civilians and 1 from the 10th Sudanese. The solitary case in the 10th Sudanese was a soldier transferred from the 14th Sudanese, and who had spent the previous year in the Bahr-el-Ghazal. . . .

"At Rumbek (a station garrisoned by twenty men of the irregulars) 14 cases occurred. It is not an exaggeration to say that at one time a fifth of the corps of Jehedieh was unable to march from this cause."

I will give you another example of the amount of inefficiency caused amongst troops exposed to infection by this disease.

In the winter of 1904-05, 30 non-commissioned officers and men of the 2nd Battery Egyptian Artillery and 39 non-commissioned officers and men of the 1st Company Egyptian Garrison Artillery proceeded to Khordofan district for duty. These men spent *the summer of* 1905 *in El Obeid.* Twice each week a fatigue party was sent out with mules to cut grass and bring it in to the station. After the breaking of the rains, pools formed in the areas where grass was cut, and from these pools the men were in the habit of drinking. The detachments returned to Khartoum in the spring of 1906.

Up to July, 1906, I had no less than 25 admissions from this party of 69 men to the Khartoum Hospital for Guinea-worm. There were probably more later, after I had proceeded on leave, but during April, May and June, 36 per cent. had been admitted. When you remember that the average time in hospital is thirty days, the amount of military wastage is at once apparent.

Another instance can be quoted from a paper by Dr. W. M. Graham, of the West African Medical Service. He reports that "in a force of native troops, averaging 350 monthly, which had been under observation during the year, 57 men, or 16·28 per cent., had suffered from the disease, and they had been incapacitated from

duty for an aggregate of 1,304 days, or for an average of 22·8 days each.

The two outbreaks which I have mentioned yield instructive results on analysis.

Taking the Bahr-el-Ghazal outbreak first, I have notes of 12 cases. These produced 20 worms in all, and the whole number affected the lower extremity, 1 being in the thigh, 9 at the knee, and 12 in the leg, foot, and ankle. This brings out clearly the preference of the worm for the parts most likely to be in contact with water.

Multiple infection was common. The greatest number of worms in one man was 7. The average for the 12 cases was 1·7 per man. In 8 cases for which I have the dates of admission and discharge, the average number of days in hospital was 26.

At Rumbek, the Dinka tribe attacked the Fort at the end of June. Of the 20 men in the Fort, only 8 were free from Guinea-worms. The others, though able to fight on the defensive, could not march in pursuit.

Turning to the Artillery outbreak, I have notes of 21 cases. These produced 56 worms, or 2·7 per man. The tendency to the lower extremity was again very marked, 3·6 per cent. of worms presenting in the head and arm, 16 per cent. in the trunk, and 80·4 per cent. in the lower extremity. Of the last, over 70 per cent. were found below the level of the knee. As I went on leave before the discharge of these men from hospital, I have no records as to duration of the disease, but believe it to have been about a month in most cases.

I need not detain you with a lengthy description of the clinical features of the disease. It is enough to say that the female worm seeks the surface, causing much pain and inflammation as she approaches her destination, and that a vesicle forms at the point of emergence which ruptures and reveals the anterior end of the worm presenting as a small white rod from the centre of an inflamed area.

The embryos are discharged through the anteriorly situated vulva under the stimulus of contact with water. If the worm snaps and frees the embryos into the tissues a severe abscess usually results.

This accident often follows treatment by traction on the worm, and is very frequently brought about by injections of perchloride of mercury solution.

Turning to the question of treatment, there is no doubt that,

if very carefully executed, the plan of winding the worm on a match, a small portion only being drawn out daily and tension avoided, often gives good results. So also does the perchloride of mercury method in some cases. But both these lines of treatment are liable to "regrettable incidents," and both are open to criticism.

In the Bahr-el-Ghazal, I formed an opinion on the whole favourable to treatment by injection of 1-1,000 solution of perchloride of mercury, an opinion which later experience has taught me to modify. I may again quote my Medical Report for that year, as it embodies my impressions after treating a series of cases:—

"I found that the best treatment was the injection of (1-1,000) perchloride of mercury solution; but this method, though sometimes followed by marvellous results, at times seems to fail altogether."

On looking over my notes, I find that even in the most favourable cases, abscesses formed after the injection of the perchloride, and these were opened and drained. The incision often made it possible to remove the worm, which was often found dead. The sequence of events was probably as follows:—

The injection either ruptured the worm directly by the impact of the needle, or by the stimulation of the fluid, led to extrusion of larvæ into the tissues, and consequent abscess formation. The pus, *not* the perchloride, brought about the death of the larvæ (that this happens has been mentioned by Leiper), and, on opening the abscess, the case rapidly recovered.

To this inimical effect of pus on the larvæ, and also to the fact that incisions, necessitated by the abscess formation, led not only to the evacuation of pus but also of the remains of the worm, sometimes still alive, I now attribute the diminished time in hospital that often follows the use of perchloride of mercury injections. Whether the use of a method which nearly always leads to abscess formation is justifiable is another question. It is certainly to be avoided when the worm is in the neighbourhood of joints. On one occasion, for instance, where abscess followed traction on and rupture of a worm, the suppuration extended to the knee-joint, which had to be opened and drained.

To illustrate the point that injections of perchloride do not always kill the worm, I will read a short extract from one of my cases, a corporal in the Egyptian Artillery, of whom a photograph, showing the worm under the skin, is handed round:—

"On April 4th, 1906, a worm-like cord was to be seen making an

'L-shaped' figure under the skin of the right chest below and external to the nipple.

"On April 11th I injected 20 minims of perchloride solution (1 in 1,000), distributed at several points along the track of the worm.

"Next day, all the horizontal and most of the vertical parts of the cord had disappeared, except that the track was represented by a faint line of ecchymosis.

"At the upper end of the vertical arm a puffy swelling had formed. . . . A few days later an abscess formed at this point and was opened. From it two *live* Guinea-worms were removed. Another small abscess formed at the foot of the 'L-shaped' area, from which a third living worm was taken."

What happened I take to be as follows :—

The two injections that happened to approximate *to the anterior extremities* of worms stimulated the parasites to extrude their larvæ into the tissues. Abscesses resulted at both these points. The injections *along the course* of the worms led to no such abscess formation, as at these points no extrusion or larvæ took place. Had the needle happened to penetrate the worms at these points, abscesses would probably have followed the mechanical liberation of the larvæ. It is to be noted that the worms themselves were intact and alive. The injections certainly accelerated the cure, as these, given on April 11th, were followed by evacuation of the worms on the 17th and 18th, and the healing of the wounds a few days later.

On the whole, the method by gradual traction on the worm commends itself to me as better than the perchloride method, provided it is done with reasonable skill and with very thorough antiseptic precautions. There are, however, two dangers. On the one hand, the worm forms a line of admission for bacteria from the surface to the deeper tissues. On the other, rupture of the worm may easily take place, and will nearly always be followed by abscess formation. Even when carried out with perfect success, the process is a slow one, and, where multiple infection exists, involves many weeks in hospital and a great expenditure of time and trouble to the medical officer concerned.

The method that is most strictly scientific is the daily douching of the protruding end with sterile water, the affected area being protected in the intervals by a loose, moist, aseptic dressing, and the limb being immobilized. The douching leads to the natural extrusion of the larvæ at the surface under the stimulus of cold

water. When all the embryos have been extruded, the dead worm can be pulled out without difficulty, or, if not accessible, will soon be absorbed by the tissues. This method again involves a protracted stay in hospital, but is quite without risk if properly carried out.

Were I again in charge of cases, I should apply traction where the worm was in a safe situation, and should adopt the water method for all worms in the vicinity of joints.

Prophylaxis can be attempted along two lines : by filtration of the water, and by preventing the infection of pools. The cyclops, being a large organism, is stopped by the coarsest kind of filtration, and all you have to do is to get your troops to strain their drinking water through khaki or any fairly dense material. This can be done in cantonments, but that is just where the disease is not contracted. It is in the pools, refilled by the early rains, that the cyclops abounds, and these pools, infected by natives, who enter them for ablution purposes and to fill water-vessels, are often the only water supply on the line of march in infected districts.

You will note that June and July, the months of the early rains, are the months of greatest prevalence of the local lesion. The native liberates embryos from his parasite into the pool whence his water supply is drawn. These, after a sojourn in the cyclops host, return to the human stomach, and thus pave the way for a fresh infection of the pools in the succeeding year.

The real prophylaxis consists in preventing infection of the pools. This can be approached by building troughs for the natives to draw water from, and policing the banks of the pools to prevent people entering the water. This is a counsel of perfection. It cannot be effectually carried out except near stations, or, in other words, places where a good water supply is already at the disposal of troops. It is on the line of march or on detached duty that infection of troops will occur.

Still, although the disease is difficult to prevent, much may be done to lessen its incidence. Nobody wants to get Guinea-worm, and if once the native can be convinced that a given measure will prevent it, there is a chance of his mending his ways. In the meantime it is well worth while for a military administration, with its eye on possible operations in infected areas, to improve the sources of water supply along strategical roads, to have combatant officers instructed in the causation and prevention of the disease and to attempt the isolation of infected civilians during the two or three dangerous months of the year.

Much research work remains to be done on the lines already indicated by Graham in his papers on this subject.

The varieties of cyclops that serve as intermediate hosts, their life-history, and the possibility of preventing their existence in pools and wells, all offer profitable lines of research.

DISCUSSION ON MAJOR POLLOCK'S PAPER.

Brigade-Surgeon BEATTIE said that when he was serving he saw no malingering; he believed that when malingering did occur to any extent it was evident that the men were not being properly managed.

Surgeon-General GUBBINS endorsed Major Pollock's opinion that one should be specially careful in coming to the conclusion that a man was malingering; he cited instances in support of this. In the case of mental disease one had to remember that soldiers were armed, and it was better to make a mistake and allow a malingerer to pass than to have a tragedy. The proposal to establish one place for observation of mental cases in India was not practical on account of the distances to be travelled; there should be four or five. He thought that at home all mental cases should be transferred to "D" block at Netley for observation.

Major W. S. HARRISON said that with regard to spurious palpitation it was common for this to be produced by chewing cordite, which caused similar symptoms to those caused by the injection of nitrites. He referred to the case of a Royal Army Medical Corps recruit, who came under his care complaining of pain in the loin, radiating down into the testicle, and stated that his urine was bloody after the attack. When he was admitted there was no blood in the urine, but on the following day there was a copious deposit of what appeared to be pus, microscopic examination, however, showed that the supposed pus consisted of starch granules, and it had evidently been simulated by the addition of dusting powder to the urine.

DISCUSSION ON MAJOR CUMMINS'S PAPER.

Lieutenant-Colonel Sir W. B. LEISHMAN inquired as to the habits of Egyptian soldiers in the matter of wading in water. He was very sceptical about the intelligence of filariæ leading them to go to parts where transmission to other hosts was facilitated. He asked if Major Cummins had had any experience of the treatment by injecting perchloride of mercury directly into the prolapsed uterine opening of the worm?

Major CUMMINS replied that at home in Egypt the men lived a great deal in the water, but in the Sudan they wore boots and were not so constantly in the water; but the Sudanese, who were the main source of infection, were constantly paddling in water up to their knees.

Clinical and other Notes.

FOUR YEARS' SURGERY IN GIBRALTAR.

By Major H. V. PRYNNE.
Royal Army Medical Corps.

In this paper I propose to give a short account of the major surgical operations which were performed during my four years' tour in Gibraltar, as also of some of the more interesting cases which occurred in the garrison. Some of these cases present certain features of interest, but the paper was written mainly with a view of showing how much surgical work may fall to one's lot even in a moderate-sized garrison. Altogether 233 operations were performed, but I only propose to notice those of special interest.

Hernia, Radical Cure of.—Thirty-six cases were successfully operated on by Bassini's method; two of these subsequently showed slight bulging of the scar owing to a too early return to duty.

One case of femoral hernia was operated on; a flap of the pectineus muscle being carried up and secured over the femoral canal.

Appendix.—In five cases the appendix was successfully removed.

Case 1.—Operation sixteen days after onset. There was a short meso-appendix producing kinking and vascular changes. The distal end was bulbous, and purplish-black in colour, and the lumen was constricted ½ inch from the tip.

Case 2.—Operation twenty-third day after onset. Appendix pelvic. Very few adhesions.

Case 3.—Operation forty-two days after onset. Appendix adherent and swollen; pus escaped while in process of removal.

Case 4.—Operation twenty-one days after onset. Apex of appendix adherent to abdominal wall. Lumen showed stricture ½ inch from distal end.

Case 5.— Operation five days after onset. Appendix swollen, congested, and bound down by soft adhesions.

Appendicular Abscess. Case 1.—Operation ten days after onset. Previous to the operation the pulse-rate had decreased, but the temperature gradually rose and iliac resistance increased. Leucocytosis. Retrocæcal abscess.

Case 2.—Operation fifty-eight hours from onset. Collapsed on admission. Pulse 90. Very large retrocæcal abscess.

Case 3.—Operation seven days after onset. A swelling in the right iliac fossa, extending towards the left side. Pus thick, viscid and greenish. He developed cough with expectoration containing pneumococci: complicated by phlebitis of both legs.

Case 4.—Operation ten days after onset. Collapsed on admission. Purulent sputum developed five days after admission, and contained pneumococci. An exploratory aspiration for empyema, or subphrenic abscess, was performed before the appendix region was explored. Pus appeared to track behind colon. The last two cases had fæcal fistulæ, which healed readily under irrigation with hydrogen peroxide.

Case 5.—Admitted with a history of abdominal pain of seven days' duration, accompanied by pyrexia, which persisted after admission, while the pulse-rate increased and an iliac swelling developed. The illness was attributed by the patient to repeated blows in the right iliac region from the handle of a bit which he used at his work. Operation nine days after onset. Large and very extensive abscess evacuated, the pus was thin and very offensive. Swelling not markedly affected by operation. Temperature fell, but pulse continued rapid. Five days after the operation the temperature rose somewhat, and his pulse increased to 166; the following morning slight hæmorrhage was present on the dressings. Wound explored under ether, and a large amount of clot evacuated from pelvis; several thrombosed veins felt. Wound packed as no bleeding point was found. For some days the cavity was daily irrigated under an anæsthetic, and offensive, disintegrating clot removed, apparently permeated with *Bacillus coli*. Six days after the bleeding the temperature rose slightly and the pulse-rate increased, but no accumulation of pus was found. The pulse continued rapid, but no abdominal pain or distension was present. At 4 p.m. next day, after using a bed-pan, the patient was seized with severe pain in right hypochondrium. His pulse became small and thready, and the respiration shallow. Transfusion, saline enemata, hypodermic injections of strychnine, and adrenalin by mouth all proved unavailing.

Post-mortem Appearances.—Fluid blood and clot in large quantities in the peritoneal cavity. The abscess cavity on the right side communicated with a large purulent collection behind the sigmoid flexure, extending into the pelvis on that side. Pus was also present behind the peritoneum in the epigastric region. The appendix was embedded in dense adhesions behind the cæcum. Several caseous mesenteric glands had broken down to form small localised abscesses. The source of the hæmorrhage was not found. With all these conditions present the patient's temperature was normal for four days, and he was able to enjoy his food.

Psoas Abscess.—Admitted with red and tender swelling in the groin, simulating bubo. This was incised and only straw-coloured albuminous fluid escaped. Transferred to surgical division, where the opening was enlarged under ether, and a cavity full of offensive sloughs found. This cavity extended from the iliac fossa to the inner side of the thigh. The cavity was scraped and irrigated. No dead bone was felt. The sinus healed and the patient was discharged to light duty. He was readmitted

on account of a persistent discharge from the sinus, which was explored under ether, scraped and packed. Secondary hæmorrhage from a branch of the superior epigastric artery occurred, but could not be located when the case was explored under anæsthesia, as the vessel had apparently thrombosed, pressure having been previously applied for forty-eight hours. The sinus failing to heal, an incision was made in the abdominal wall parallel to Poupart's ligament. The peritoneum was then stripped inwards from the iliac fossa. The cavity was found to lead towards the iliac fossa, and to the spines of the lumbar vertebræ, but no evidence of bone disease was found. The cavity being so extensive, no attempt was made to excise the abscess, but the track was freely enlarged and scraped. The sinus did not heal and the man was invalided. I have since heard a rumour that he died after an operation at home, but have not been able to verify the the statement.

Stricture of Intestine.—In this case there was a history of chronic obstruction, with six or seven acute attacks. The lower part of the ileum was found surrounded by adhesions. The bowel showed some diminution of lumen with dilatation above. The adhesions were freed, but the patient's condition would not allow of a resection. The bowel subsequently ruptured above the site of stricture, and general peritonitis supervened.

Gunshot Wound of Bowel.—Admitted with gunshot wound of abdomen. The original shock having passed off, an attempt was made to suture two wounds in the ileum. The patient was, however, moribund at the time, and died under the anæsthetic, before the second wound could be sutured.

Laparotomy.—One for lodgment of bullet.

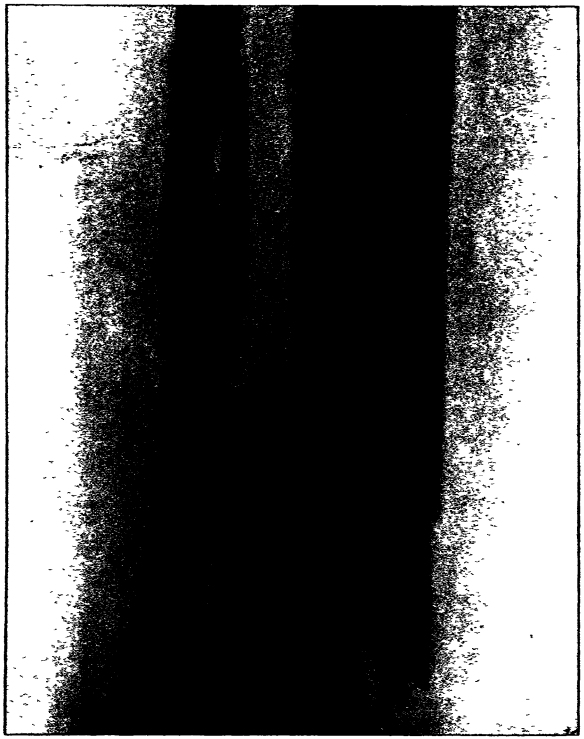
Case 2.—Transferred from medical division with pain in right hypochondrium, pyrexia, enlargement of gall-bladder, and clay-coloured stools. It was originally intended to aspirate for possible liver abscess. On the morning of operation patient passed a dark stool almost entirely bilious in nature. The result of the operation was negative, as the gall-bladder was found to be normal, but the temperature remained raised, and bronchitic râles, present from the outset, increased. Eight days after operation the man began to expectorate purulent sputum containing no tubercle bacilli. Three days later friction sounds over the right base became evident, with impaired breath sounds, followed a few days later by an area of dulness at the right base, with absence of the breath sounds. The breath sounds remained absent for several days, and slowly returned. For a few days sputum ceased, and temperature rose, but subsided as expectoration was re-established, and ceased when sputum was no longer expectorated.

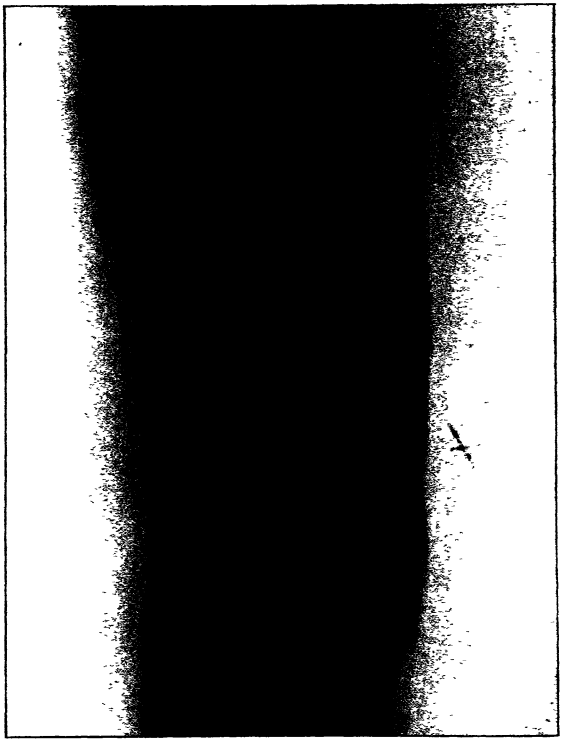
Case 3.—This case was admitted with a history of having fallen 60 feet on his face and abdomen. On admission the patient was blanched, pulse 118; respiration entirely thoracic; general abdominal rigidity and tenderness. Bruising over both iliac and hypogastric regions. The urine was

drawn off and found free from blood. A motion passed was also free from blood, but pain persisted in the right loin, and seventeen days after admission he complained of abdominal pain on movement and micturition. Five days later increased resistance was present in the right iliac fossa and his temperature commenced to rise. This condition culminated in redness, and great tenderness with marked swelling in the right iliac region, but neither melæna nor pain on defæcation were present. Under ether an incision was made over the swelling, and on opening the abdominal cavity several coils of inflamed bowel were found adherent to the anterior abdominal wall. There was a small slough in one place, but no fæcal or purulent matter found in any other region. The following day fæces and bile escaped freely from the wound. Ten days later pain was felt in the left iliac fossa, and down the left thigh, and both these regions were swollen and tender. The skin of the right groin became reddened and tender, and a fæcal fistula developed, while the original incision tended to close. Boric enemata escaped freely and rapidly from the incision. A week later, a tender swelling developed in the left iliac fossa and apparently contained gas and fluid, so on the succeeding day, under chloroform, an incision was made over the right rectus, and the abdomen opened. The artificial anus was found to be situated in the lower ileum, about 6 inches from the ileo-cæcal valve. A lateral anastomosis of ileum to ascending colon was performed by suture. The left iliac fossa was found to contain a number of enlarged iliac glands. Resection was judged inadvisable owing to the man's weak condition. He rallied well from the operation, but had to be fed by nutrient enemata, as he refused nearly all food by the mouth. The wound from the second operation became infected, owing to the close proximity of the artificial anus, which was only 1½ inches away. The patient gradually grew weaker, as he refused food by the mouth, and nutrient enemata were discharged through the artificial anus, or returned without being altered. He died seven days after the operation.

The autopsy showed extensive infection of the cellular planes, extending from the artificial anus at the site of the first operation, down each thigh, and over the front of the abdomen on both sides. No leakage had occurred from the side of the intestinal anastomosis, and no septic peritonitis was present. No second opening in the bowel was found to account for the escape of the enemata at the external wound.

Case 4.—Admitted in a state of collapse, with a history of sudden abdominal pain, followed by collapse. He was very restless and complained of pain, which he referred to the umbilicus. The left rectus muscle appeared slightly rigid. The patient was very blanched, with a small and rapid pulse, 118. As the case was clearly one of internal hæmorrhage, arrangements were made for immediate laparotomy. The patient died, however, before anything could be done, and the autopsy





Figs. 1 and 2.

To illustrate "Four Years' Surgery in Gibraltar."
By Major H. V. Prynne, R.A.M.C.

showed rupture of an aneurysm of the transverse aorta, in front and beyond the origin of the left subclavian artery.

Empyema.—This was a very extensive left-sided empyema. Despite free drainage after resection of rib, the pus tracked among the lumbar muscles, and a secondary abscess had to be opened above the crest of the ilium. At the autopsy the lung was found collapsed and compressed against the spine and pus had gravitated below the drainage opening.

Tuberculous Cavity of Lung.—This case was one simulating empyema, but on exploration there was found to be a large suppurating cavity in the lung. This was successfully drained, but the patient died of exhaustion.

Fractures of Long Bones and their Treatment.—One case of fractured olecranon, and one of fractured patella, were wired. The former was an old case, in which the fibrous union had snapped owing to the man testing a battery and receiving a very severe electric shock. The patella case, in which the upper fragment was small, left hospital with free movements. I have since heard from another station that the wire cut out, but I have not seen the skiagram. All other cases were treated by immediate massage and early movements, with the limited use of splints during the first few days and to prevent injury when the man was restless or asleep.

The matter of the operative treatment of fractures is at present under discussion. Many writers draw attention to the deformity and disability resulting from non-operative lines of treatment, but results must not be judged merely from X-ray appearances, but from the degree of utility and function obtained. The upper limb injuries do not, in my opinion, call so imperatively for operative interference, as do many fractures of both bones of the leg. It should not be forgotten that in these cases bone may have to be removed in order to secure apposition of the ends. Until the functional results of operation can be shown to be better than those of other lines of treatment, the question cannot be said to be settled. Three cases of fracture of both bones of the leg returned to duty in periods of sixteen weeks, twelve weeks, and eight weeks. These periods of inefficiency are no doubt very considerable, but depend so largely on the man's reflex inability to use a leg that is painful and weak, that it is doubtful to what extent it can be reduced by operation. One case of fracture of the upper third of the shaft of the humerus returned to duty in ten weeks, the cause of delay being weakness due to paresis of the deltoid, supra-spinatus and infra-spinatus muscles, which could not have been lessened by any operative treatment.

The skiagrams (1 and 2) of a bad fracture of both bones of the leg, treated by massage, &c., show the condition before and after treatment. Two fractures of the olecranon showed no displacement, and so operation was not needed.

Amongst the fractures of hand were two examples of Bennett's fracture of the base of the first metacarpal bone, and several cases of impacted fractures occurring during boxing. No fracture or dislocation

of any carpal bones were seen, though all cases of injury were examined by X-rays. Undoubted cases of such injuries occur, but without a skiagram of the sound hand, it is possible to frequently mistake other injuries, such as impacted fractures of metacarpal bases, for them.

The two cases of fractured femur returned to duty; one was an impacted fracture of the femoral neck, resulting in ½ inch of shortening; the other, a fracture of the shaft, lead to ¾ inch of shortening. One case of patellar fracture was explored with a view to operation, but as there was no evident separation, no operation was considered necessary.

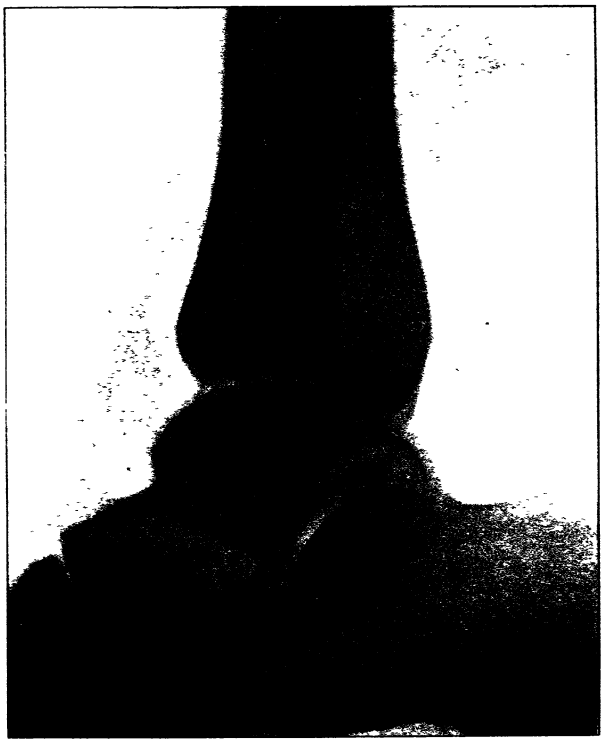
Many of the fractures of the fibula were of the fissured variety, and only involved the external malleolus. A large number of these were only discovered on X-ray examination. When in temporary charge of X-ray work at Woolwich, a number of cases of apparent sprain were found to present similar injuries. These fissures are often so slight that the screen will not show them, but they can be plainly seen in the skiagrams 3, 4, 5, and 6.

Of the shoulder dislocations two were recurrent cases. These were dealt with by the operation of reefing the capsule. I have since learned that this operation is unscientific, as the looseness of the capsule depends on the want of tone in the muscles. Both cases were without recurrence some months after operation. One dislocation of the interphalangeal joint of the thumb, and one of the interphalangeal joint of the little finger, were compound. The former returned to duty with limited movement of the joint, and the latter with an ankylosed joint.

General anæsthesia was preferred to local in most cases. The latter is a lengthy business, and unless one is absolutely single-handed, is no saving. Further, one's experience with eucaine and adrenalin was that wounds did not suppurate certainly, but yet did not heal cleanly and securely. The gaping of the wound, and the escape of fluid, were common features in these cases. There is the additional difficulty of securing anæsthesia in the deeper layers of tissue. Both spinal and local analgesia may have their uses in cases of extreme shock and in cases where general anæsthesia is inadvisable, but one feels that the ability of the patient to hear the conversation or watch the expression of operators is often very much to be deprecated: in cases of difficulty some discussion may be necessary, or trivial accidents or complications happen, and for the soldier to be made cognizant of any details of his case, such as these, is highly objectionable. Spinal and local analgesia have, I believe, been used chiefly in planned operations, and the extent of their usefulness under Service conditions has yet to be gauged.

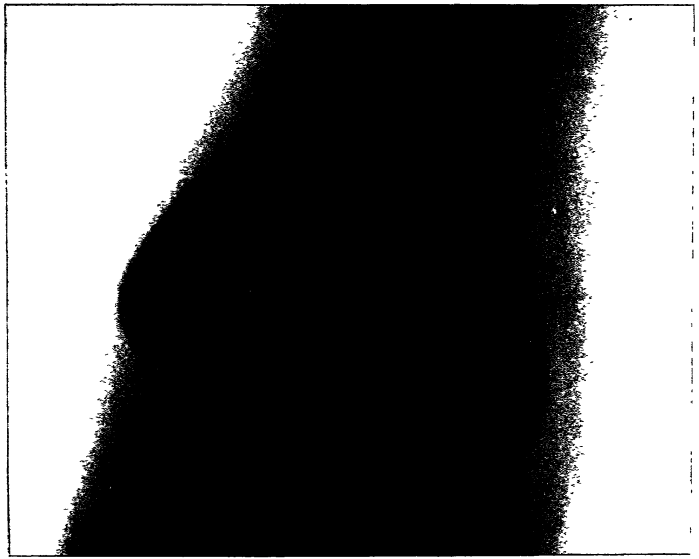
The skin preparation of the patient has lately been carried out entirely by painting with tinct. iodi the previous day, and applying sterile compresses, the operation area being again painted before the operation commences. The results have proved most satisfactory. Ligatures have usually been of silk, or catgut prepared by soaking in iodine solution.

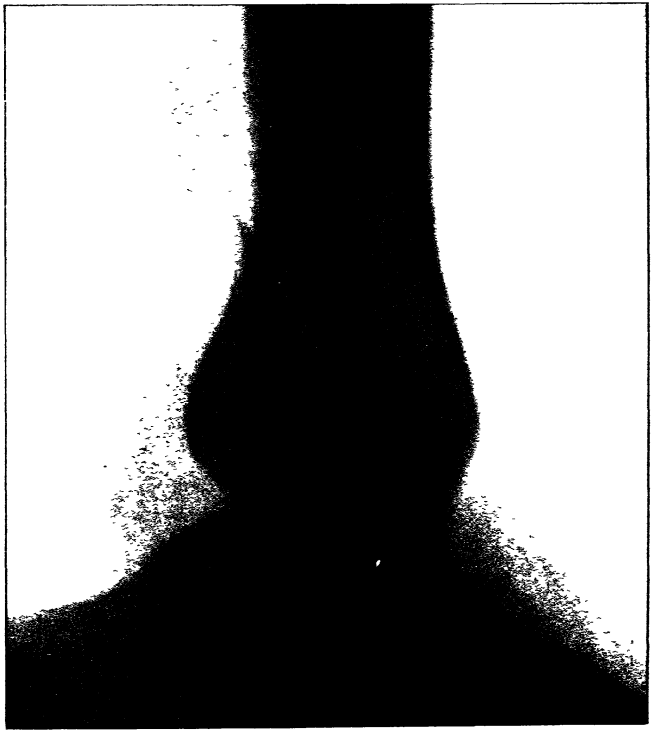




Figs. 3 and 4

To illustrate "Four Years' Surgery in Gibraltar."
By Major H. V. Prynne, R.A.M.C.





Figs. 5 and 6.

To illustrate "Four Years' Surgery in Gibraltar.
By Major H. V. Prynne, R.A.M.C.

The sutures usually employed have been silk or silkworm gut. Kirkpatrick's method of carrying patients from the stretcher to the operation table, and the reverse, has been employed.

I should like to enter my plea for the addition, to each hospital establishment of over one hundred beds, of an orderly who has been trained as a masseur. Massage is now so generally used in cases of injury that his time would be well employed, and cases would benefit greatly by systematic treatment. Untrained massage is a danger.

LANDRY'S PARALYSIS AND MALTA FEVER.

By Surgeon-Major R. SAMUT.
1st K.O.M.R. of Militia.

This case is of interest, inasmuch as it proves that acute ascending, or Landry's paralysis may arise during an infection by the *Micrococcus melitensis*.

E. G., aged 25, coachman, was admitted to the Central Hospital, Floriana, in a semi-comatose condition. He answered questions with the greatest difficulty, so that little could be known with regard to the onset of the disease. The information elicited from his friends was meagre and incomplete, as the man was a bachelor and lived alone. The patient had complained of feeling weak and of being easily tired for about a week prior to his admission to the hospital, but he was able to attend to his duties without difficulty. On the day of admission he had been to church in the morning, and had knelt for some time, when he felt that his knees "were giving way." He tried to stand up, but was unable to do so, and after repeated efforts to raise himself he had to call for help and was carried home, where he remained till the afternoon, and was then transferred to hospital for treatment.

On admission, the patient was suffering from complete paralysis of the lower extremities; the upper extremities were affected to a less degree. Sensibility to ordinary touch was normal throughout the body. The knee, plantar, and cremasteric reflexes were completely abolished; all other reflexes were greatly diminished. The pupils reacted to light and accommodation. Speech was slow and the patient articulated with difficulty. The sphincters were normal. The urine was loaded with phosphates, but contained neither albumin nor sugar. The temperature ranged between 101° and 102° F.

Signs of diaphragmatic paralysis became manifest on the second day after admission, and respiration was intercostal and laboured. The patient became comatose and died of asphyxia forty-eight hours after admission to hospital.

The case was clearly one of acute ascending or Landry's paralysis,

and I was eager to study the pathological changes of the spinal cord and its membranes.

I performed the *post-mortem* examination and kept the following notes: Spleen greatly enlarged (three times its normal size, soft and friable). Liver, signs of cloudy swelling present. Kidneys enlarged and hyperæmic. Stomach normal; the intestine showed patches of congestion in the lower part of the ileum, solitary glands slightly congested and raised. Heart flaccid and its cavities dilated. Lungs œdematous. Brain and cord apparently normal; meninges in the vicinity of the pons hyperæmic; those at the level of the cervical enlargement extremely congested and almost hæmorrhagic.

From the above data one could not exclude the possibility of an acute general infection, and in order to establish the nature of the infecting agent, I made several smears on agar from broth cultures of the spleen, bile-ducts, and cerebrospinal fluid; these were labelled I., II., and III., respectively. A growth appeared in I. after three days' incubation at 37° C., while II. and III. remained sterile. The colonies were greyish-white, circular, and transparent; and consisted of cocci which did not stain with Gram's method. Cultural reactions showed that the micro-organisms did not liquefy gelatine and did not ferment glucose, lactose, and saccharose. Litmus milk was not clotted. Neutral red was unchanged after sixty hours' incubation. MacConkey's bile-salt broth was unchanged. A positive agglutination reaction with the serum from typical cases of Malta fever, in a dilution of 1 in 200, was obtained in a few seconds. There could be no doubt that the micro-organism isolated from the spleen was the *M. melitensis*, and that the signs of ascending paralysis in this case had supervened during the course of an attack of Malta fever.

REACTION OF SERA OF ANOMALOUS AND OTHER FEVER CASES TO *BACILLUS COLI.*

By Major F. SMITH.

Royal Army Medical Corps.

In thirty-six consecutive cases sera sent for examination have been tested for agglutination with *Bacillus coli*. A surprisingly large proportion showed a positive reaction, and in a few instances the reaction was so pronounced as to suggest that *B. coli* may be an occasional cause of a typhoid-like fever in India.

Number of cases examined	36
,, positive to both *B. typhosus* and *B. coli*	4
,, positive to *B. typhosus* and negative to *B. coli*	2
,, negative to *B. typhosus* and positive to *B. coli*	13
,, negative to both *B. typhosus* and *B. coli*	17

The examinations were made microscopically, employing a twenty-four hours living broth culture. Reactions below 1 in 20 were not taken into account.



JAMES GOODALL ELKINGTON.

Surgeon *30th Regiment.*

Shortly after his return from Waterloo.

Echoes from the Past.

SOME EPISODES IN THE LIFE OF JAMES GOODALL ELKINGTON, AN ARMY SURGEON IN THE PENINSULAR DAYS, TOGETHER WITH EXTRACTS FROM HIS JOURNAL.[1]

By Lieutenant-Colonel H. P. ELKINGTON.
Royal Army Medical Corps.

James Goodall Elkington was born on October 2nd, 1784. After serving as an apprentice to a surgeon in Bath from 1800 to 1805, he went to St. Bartholomew's Hospital, and obtained his diploma from the College of Surgeons on January 15th, 1807. He then appeared before the Medical Board in Berkeley Street, and received his warrant as hospital mate on August 8th, 1807.

His first duty in the Army was that of assistant to the apothecary at Chelsea.

On September 7th he received a sudden order to report without one moment's delay to General Beresford, through Deputy-Inspector McGrigor at Portsmouth, for foreign service. He embarked for Cork in a transport on September 19th, which he did not reach until October 27th, owing to contrary winds. On November 10th, as the expedition was countermanded, he was ordered to return to England, and left in a supply transport with ten sail of transports under convoy; he arrived at Spithead on November 20th. Here the troops found orders to return immediately to Cork, as they had been directed back to England by mistake. On November 24th he embarked on board the "Centaur" at Spithead with General Beresford and his staff; they arrived off Cove on December 4th, and started for Madeira on the 6th. He was attached to the Light Companies of the 3rd, 25th, 63rd, and 11th Regiments.

"Capture of Madeira.

"December 24th.—At 6 a.m. the 'Centaur' was cleared for action, and at 10 a.m., with the ships of war, passed the Brazen Head and came in sight of the town of Funchal. The situations of the different ships of war being pointed out, the 'Centaur' came to anchor with a spring on her cable at 11.30 a.m., with her broadside bearing on the Governor's

[1] This journal was compiled by him in after years from the diaries he kept while in the Field, all of which are in my possession.—(H. P. E.)

house and the Grand Battery 350 yards distant. A flag of truce sent on shore with the terms which were to be accepted or refused in half an hour. At noon the flag returned with the acceptation of the terms, the Portuguese flag was lowered, and the English flag hoisted with the usual salutes. The 3rd and 11th Regiments landed and took possession of the Forts.

"The Medical Staff on the expedition were:—

"*Deputy-Inspector.*—W. Hogg, Esq.

"*Physician.*—G. A. Morewood, M.D.

"*Surgeon.*—Carrol (relieved by Messrs. Wooldride and Taggart).

"*Deputy Purveyor.*—Matthew Emerson.

"*Apothecary.*—John Lewis.

"*Hospital Mates.*—J. G. Elkington, R. S. Morrison, L. W. Whitstone, H. McCreery, J. Thomas, W. Daunt.

"January, 1808.—The Nuns of the Incarnation Convent were removed to the Convent of Santa Clara to make room for a general hospital; the procession was very grand and had a singular effect, many of the females not having passed the walls for forty and fifty years before. They were mostly old, with one or two interesting young women.

"Madeira is principally celebrated for its wine, which is excellent and abundant. The effect of the new wine, if drunk to excess, is very prejudicial, and many of the soldiers died in the wine-houses. A suspicion was entertained that these men were poisoned, but the most minute *post-mortem* examination could not detect any such cause. Great determination of blood to the brain was clear in every case, and this was the cause of death.

"February 18th.—Orders arrived from England for my proceeding to the West Indies; was in daily expectation of embarking, but there was no vessel, and as often as the fleets arrived, a gale of wind came on which obliged them to proceed on their voyage.

"March 3rd.—Received orders to establish a Lock Hospital for the women of the Island at the factory; this measure proved as beneficial as it was humane, and completely answered the purpose intended. I continued in charge of it during my stay in the island.

"April 19th.—The 'Albion,' sloop of war, arrived with despatches for General Beresford, relating to the giving up of the Island to the Portuguese again.

"April 26th.—The 'Leander,' the ship in which General Miranda sailed to the Spanish Main, having arrived in distress with invalids of the 37th Regiment on board, I was directed to visit it and report on the health of the men, which I represented as unfit to proceed on their voyage to England without medical assistance; at the same time observed to Deputy-Inspector Hogg that being senior mate I should wish the charge. He kindly agreed to recommend it to General Beresford.

"April 27th.—Directed in general orders to take charge of the invalids of the 37th on their passage to England; embarked immediately.

"April 29th.—Weighed anchor and sailed. . . . The whole voyage which was very quick, but squally, was attended with a heavy swell; and the vessel, having been much strained, was obliged to be pumped every half-hour. She was as rotten as a pear; pierced for eighteen guns but having only three, the remainder having been thrown overboard in the gale which drove her to Madeira.

"May 13th.—Heavy fog. At 5.30 a.m. struck on the Mag Rock off Prawle Point, coast of Devon. Fired guns of distress; at 6.30 a.m. a shore boat came off; left the ship with the women and children, and the soldiers least able to assist themselves; conducted them to Kingsbridge by water and delivered them over to Surgeon Matthews, 3rd Regiment, in Barracks there.

"May 14th.—Left Kingsbridge for Plymouth, where I found the 'Leander,' having been got off the rock, had arrived.

"May 27th.—Having called daily on General England since my arrival and received as often orders and counter-orders, at length the General procured a convoy to the eastward and we were directed round to the Thames.

"May 31st.—Made the Isle of Wight and were run foul of by a Portuguese brig that carried away our only boat.

"June 4th.—Landed at Blackwall and reported arrival with the detachment at York Hospital."

On July 12th, 1808, he was gazetted Assistant Surgeon to the 2nd Battalion, 24th Regiment, which he joined at Guernsey. In April, 1809, the regiment embarked for the Tagus, where they disembarked on the 26th, and marched to Santarem. On May 18th they moved towards Sobura Formosa, but on arrival at Cardigos were ordered to halt; here they remained for five weeks, the headquarters of that portion of the army, under General Mackenzie, being at Corticada. On June 28th they moved onwards to Castello Branco, where the brigade was joined by that of General Donkin. Here the division was inspected by Sir Arthur Wellesley. They left on July 1st, arrived at Toralba on the 20th, and on the 22nd marched out and bivouacked in a wood near Talavera.

"1808, TALAVERA.

"July 23rd.—The army advanced at 3 a.m., supposed to attack the enemy, but at 1 o'clock returned, with the exception of our division that was in advance about a league on the Madrid road. I was directed to remain with the sick at Talavera, and establish a hospital. Went with my baggage to Talavera, but in the evening Dr. Ferguson directed Assistant Surgeon Rule, 87th Regiment, to relieve me. I joined my regiment in a wood one league in advance near the ruins of an old convent and within sight of the enemy's camp on the opposite side of the River Alberche.

"July 24th.—The division was under arms shortly after midnight. At 3 a.m. we advanced; each man received a pint of wine. At 5 a.m. reached the Alberche, but found the enemy had retreated during the night, crossed the river and passed the French Camp, marched through Cazalegas and recrossed the river one league beyond. The Spanish army was now in advance.

"July 25th.—Halted. July 26th a continued cannonading in our front. In the evening we crossed the Alberche and took up a position in front of Cazalegas to cover the retreat of the Spanish army that had been repulsed and were falling back in the greatest possible confusion and disorder, the whole night passed in alarms, expecting the advance of the enemy every moment.

"July 27th.—The line, consisting of two divisions under General Sherbrooke, was under arms 2 a.m., in front of Cazalegas. At 9 a.m. we retreated, as the enemy were rapidly advancing, recrossed the Alberche, and took up our old position in the wood. At 2 p.m. firing commenced, and the division began its retreat towards the main body of the army that occupied the position near Talavera, and for the last hour of the retreat we were cannonaded by the enemy, but, being in line, without much loss. At 9.30 p.m., the French attacked the hill that commanded our position on the left with great force and carried it; but it was regained and the enemy driven off with great loss. An attack was also made on the Spanish line on our right; this also was repulsed.

"July 28th.—The French 8 a.m., after heavy cannonading, again attacked the hill, but were repulsed with severe loss. At 2 p.m. they attacked the whole line and endeavoured to turn our left, but at every point were defeated, and as soon as the night approached the enemy retreated.

"July 29th.—At daybreak I went to Talavera to attend the wounded, the whole town being full of them. Our hospital was established in the convent of St. Jeronimo. Captain Evans died of his wound, a gunshot fracture of the cervical vertebra. The duties of the Army medical men were now very severe.

"August 3rd.—This morning the army marched towards Oropeza. Ordered to remain at Talavera with my wounded. At noon Lieutenant-Colonel McKinnon, of the Guards (Commandant), called all the officers together, and, after telling them that he expected the French army would shortly enter the city, he directed the whole of the Assistant-Surgeons, with Staff-Surgeon Higgins, to remain in charge of such wounded as could not get away, and that every one able to march should leave the city immediately. The whole left us in the evening to shift for ourselves. I had charge of 188 men of my own regiment, with the following wounded officers: Lieutenant-Colonel Popham, Captain Collis, Lieutenants Grant, Skene, and Allen. The whole of the British hospital may be calculated at 1800. We had a certain quantity of money and some provisions (but

as the French did not come on as rapidly as Colonel McKinnon led us to suppose, we soon fell short in the latter.)

"August 6th.—At 11 a.m. we observed the advance of the French cavalry. They shortly after entered the town under the command of General Beaumont. They plundered everywhere; but respected the British hospital.

"August 7th.—At 8 a.m. the advance of the infantry under Marshal Victor arrived; they pillaged the whole town and many wounded English officers. I secured my kit, horse, and mule by keeping them in the hospital.

"It was reported that we were to be sent to Madrid as fast as possible, and that the surgeons were not to be considered as prisoners of war.

"August 13th.—Marshal Mortier's Corps arrived. The Marshal visited the British hospitals and expressed himself as extremely satisfied with their cleanliness, which, he said, he wished was equalled in the French establishments of the same kind."

On August 22nd he was taken ill with "fever," which lasted till September 19th, and he notes in his journal that this fever was so prevalent and fatal that out of 500 British sick, ninety-two died in sixteen days. On October 28th, three months after the action, he left with the wounded for Madrid, being given a passport. On arrival at Madrid, on the 30th, the passports were taken away from the officers and all were confined as prisoners in two rooms in the Retiro. The party consisted of Sir William Sheridan (Guards), Staff-Surgeons Higgins and McDougle, Captains Coleman, 31st, and Collis, 24th; A. and G. Beamish, 31st; Assistant-Surgeons Rule, Herriot, Curby and himself, and, notwithstanding a written application from Sir William Sheridan, they could not obtain permission even to walk in the Retiro Garden.

"Attempt to Escape.

"November 7th.—George and A. Beamish, Herriot, Curby, Rule, and myself, having procured a rope, attempted to escape, and descended from the window into the garden, but one of the sentries was alarmed, and after two hours spent in endeavouring to get out of the gardens, we fell into a picquet and were conveyed to the Guard Room, from whence we were removed to the common dungeon (George Beamish and Rule had fortunately got clear and returned to their rooms). We remained a fortnight in this place, very cold, there being six windows, iron grated, without glass, and were supplied with black bread and water only; but having money and a canteen cooking machine, we procured many comforts and passed our miserable confinement in tolerable good humour.

"November 21st.—The Spanish prisoners made at Ocaña arrived 12,000 in number, and above 300 officers not one wounded."

On November 26th he was ordered to leave Madrid with twelve English officers and 100 English soldiers, together with 200 Spanish officers and 2,000 Spanish privates. They evidently had some exhausting marches, and were all confined together, officers and men, in immense barns. This state of affairs continued until after they passed Segovia, where a new Colonel for the convoy joined, a Colonel Krutzer, of the 2nd Regiment of Nassau, who directed that the officers should have billets every night. In recounting the march, he notes in the journal:—

"Many Spanish prisoners were shot, some as a warning to deter others from attempting to escape, and all that could not march, owing to weakness or disease, were immediately shot. This plan was followed during the whole of our route to Bayonne, and I may safely say that in this manner nearly 200 were butchered in our convoy."

The convoy passed through Valladolid, Burgos, Tolosa, and reached Bayonne on December 20th, where they reported themselves and the officers were given passports and a route to Verdun, to which they travelled by coach, arriving on January 14th, 1810. While at Verdun he was treated as comfortably as a prisoner of war could expect to be.

"1810.

"The number of English officers (prisoners) was very great—nearly 600. Since the departure of General Wisson, Governor of Verdun, their situation had much improved; he had rendered it by his extortion and cruelty almost insupportable. Being called to account by the Minister of War, he shot himself. His successor was also degraded, and was followed by a Baron de Beaucherre, a mild gentleman, who 'conducted everything to the satisfaction of all parties.' Every fifth day by 10 a.m. we had to write our names in a book, this was called 'The Appel,' and every 24th of the month we were mustered by the commissary in the riding house. These two forms observed, the rest of the time was our own. (Photo of passport while at Verdun)

"Our day was commonly spent in walking round the ramparts, or to one of the neighbouring villages, as we had the circuit of two leagues, about six English miles. The club-room also took up much of our time. Here was a good room with every newspaper, and furnished with chess and backgammon boards, a good billiard table and a card room, where there was often very great play, but no game of chance with dice was allowed: in short, the whole concern was well conducted. An excellent set of comedians made many of our evenings pass rapidly. The exchange

on England was generally much below par, but money was always to be got for good bills, and the English seemed always well supplied. By their extravagance they had doubled the price of every article and greatly enriched the town. The living was cheap and good. Thus had I conceived I was to have been only a short period here, I could not have wished to have passed my time in a better quarter; but being uncertain as to the duration of our confinement, it became every day more tiresome and irksome. We had been for some time buoyed up with the hopes of a general exchange of prisoners, Mr. Mackenzie having arrived at Morlaix for that purpose; but this, as all other negotiations with the French Government, fell through.


PLACE DE VERDUN. N° de l'enregistrement.
Anglais.
Permission de sortir de la Place.
SIGNALEMENT.
Yeux. Cheveux. Front. Nez. Bouche. Menton. Visage.
Il est permis à Mr. J. Elkington
Prisonnier de Guerre, de sortir de la Place pour les postes
Il devra être rentré à 9 h. du soir au plus tard.
Verdun, le quatre Avril 1810.
Signature du porteur.
Le Commandant du Dépôt des Prisonniers de guerre Anglais

PHOTOGRAPH OF PASS ISSUED TO SURGEON J. GOODALL ELKINGTON WHILE A PRISONER OF WAR AT VERDUN.

"The surgeons left with the wounded at Talavera had sent one memorial to the Minister of War (before my arrival), without effect. We now determined to forward a second, which I drew up as follows: 'The undersigned medical officers of His Britannic Majesty's Service, having been for the sake of humanity left in charge of the English and French wounded on the retreat of the British army from Talavera, became prisoners of war. Whilst performing their duties at Talavera they received the commendations of Marshals Mortier, Victor and

Sebastiani. They humbly request to be allowed to return to their country, throwing themselves on the known clemency of the Emperor [this last sentence created opposition, but it was my opinion that, to gain our point, it was fair to use any flattering expression]."

This memorial, fortunately, reached the Emperor shortly after his marriage with the Archduchess of Austria, and on May 13th they received passports for Morlaix. He left Verdun on May 17th, after a stay of four months; passed through Paris, where he remained a few days sight-seeing, and eventually reached Morlaix on June 3rd (*viâ* Versailles, Alençon, Mayenne, and Rennes), where he and several others hired a vessel, reached Plymouth on June 8th, and, after reporting his arrival, he was granted leave of absence. On July 8th he received an order to rejoin his regiment, but on representing that his claims for loss on exchange and for his baggage had not yet been settled he was granted further leave.

"August 14.—Received orders, or rather entreaties, from the Medical Board to repair immediately to Portsmouth to embark for Lisbon, a general action being shortly expected.

"August 15th.—Arrived at Portsmouth, reported myself to Staff-Surgeon Fraser, in the absence of Dr. McGrigor, and applied for a passage to Lisbon—answer, no vessel ready!

"August 24th.—Received orders to embark on board the Rialta Transport, letter D., a dirty old collier brig just taken up, and on board which thirty-three officers were placed, with a few soldiers to act as servants. Our berths were between decks; the prospect of a pleasant voyage was therefore small.

"September 16th.—Landed at Lisbon."

On September 25th he left Lisbon for Coimbra, but on arrival at Pombal he met and dressed many wounded, and heard of the retreat of the army after the battle of Busaco, and that his regiment, the 24th, was retiring to Leiria, where he joined them.

"Retreat from Busaco.

"October 2nd.—I went to the quarters I had occupied a few days before on my way up, but it exhibited a serious change; the owner of the house, a priest, had fled, the apartments were filled with stragglers, English, Portuguese soldiers, and muleteers; most of the furniture taken away or broken up. . . . During the day's march the whole road was covered with the retreating army, baggage, ammunition, and stores of all kinds; added to which the inhabitants with their property, some in cars, others carrying their children and property; nuns, priests, aged, sick, and infirm—in short, the whole population—in full flight; terror in every countenance—a sight more distressing has been but seldom witnessed.

On the road articles of furniture and clothing, that the weary fugitives could carry no further, were lying in all directions. Fortunately the weather was fine and remained so till we nearly reached 'The Lines' of Torres Vedras, when it became very wet and windy, and much embarrassed our movements, in a country where the roads are at all times bad.

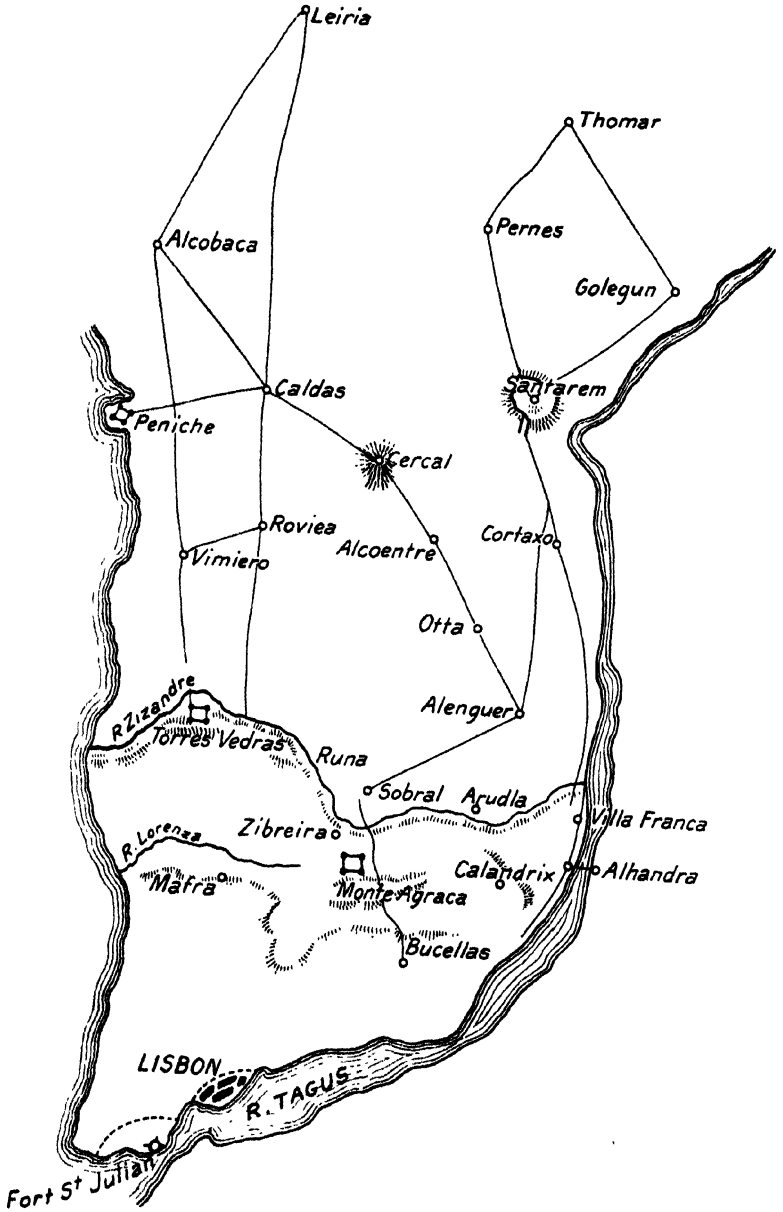
"October 5th.—The division bivouacked near Carvallos. Here I was nearly taken prisoner. The regiment fell in, as usual, an hour before daybreak, and whilst the men were under arms I lay down with the bridle of my horse round my arm and fell asleep. The troops marched off without the least noise, the enemy being on this side of Leiria. I slept for some time, when the movement of my horse awoke me and I found myself alone. I immediately mounted, and proceeded as fast as possible to the rear, keeping the high road in sight, and as soon as I reached a commanding spot, having a good glass, I minutely examined the high road, and at a distance discovered the rear guard of the cavalry of our army retiring. I made the best of my way and was soon in safety. Another half-hour's sleep would have made an awkward change in my situation.

"ACTION NEAR SOBRAL.

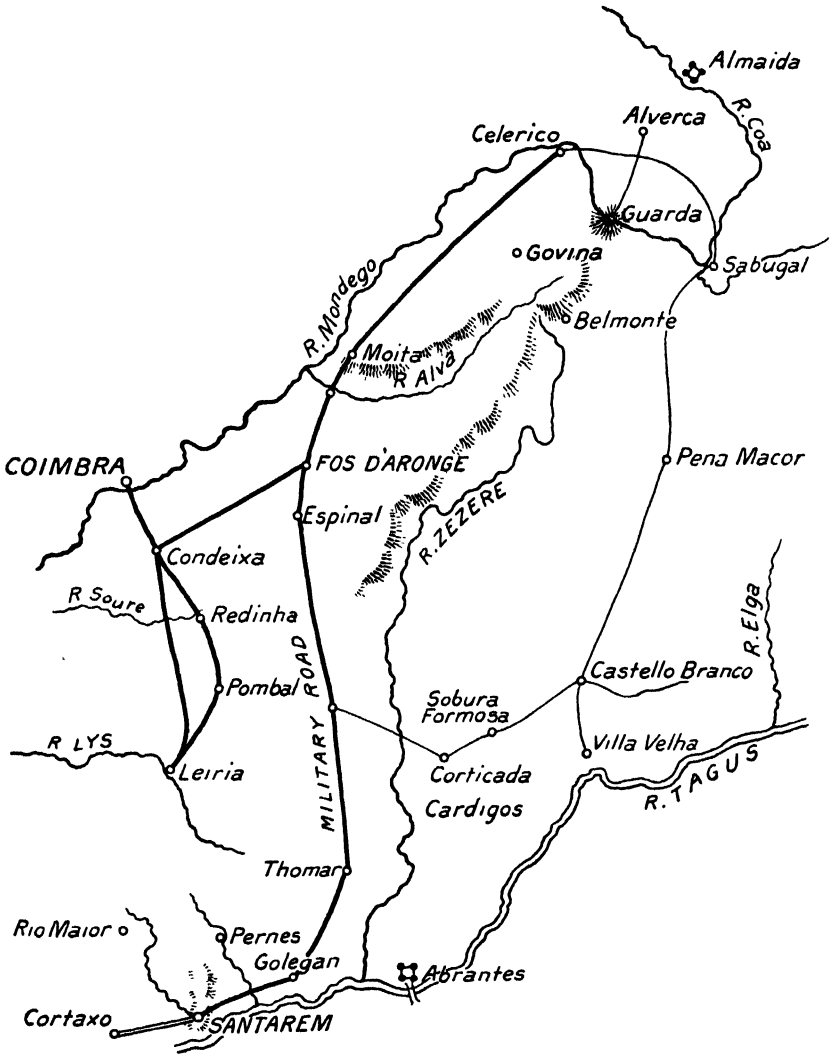
"October 14th.—While marching to position near Sobral, a Corporal Buckingham of the regiment had both knees fractured by a cannon shot, a few yards in my rear. After the skirmish, which was pretty severe, the enemy retired. We now proceeded to amputate the legs of the corporal; the operation had not been long performed when an order arrived to remove all sick and wounded to the rear. I was directed to superintend this removal. At 8 p.m. moved off with the wounded in bullock carts, passed the large Redoubt, and followed the road to Bucellas; a more tempestuous night or worse road I seldom passed. At about 4 a.m. on the 15th I reached Bucellas and delivered over my charge, having first redressed the corporal's stumps, the rain and motion having laid them bare. The suffering of this man and the other wounded from the roughness of the road was very great, their cries during the whole night horrible, and frequently they requested to be shot. As soon as it was daylight they were placed in spring wagons to proceed to Lisbon. (This corporal recovered, and afterwards followed his trade as a weaver near Leicester.) I now returned towards the army, and joined my regiment in the Lines of Torres Vedras."

He remained with his regiment in "The Lines"[1] till November 16th, when, the enemy having retreated, they marched to Santarem and then to Cortaxo, where they remained till March 6th, 1811, when they again advanced, following up the retreating French

[1] *Vide* Sketch of Lines.



THE LINES OF TORRES VEDRAS, covering Lisbon, reached from near Torres Vedras to Alhandra on the Tagus (29 miles in extent).



ROUGH TRACING OF ROUTE FOLLOWED BY THE BRITISH ARMY AFTER THE FRENCH RETREATED FROM BEFORE THE "LINES OF TORRES VEDRAS"

army through Espinal and Alverca towards Almeida, where they arrived on April 9th,[1] and remained till May 11th, when the enemy escaped. He was then sent to do duty at the General Hospital at Villa Formosa, and on May 22nd he proceeded in charge of a convoy of sick and wounded to Coimbra, where, on arrival, he notes :—

"The Commandant at Coimbra was very angry that I had taken no account of the kits of the men who had died on the journey, and said he would report me. I begged he would state that there being no military officer (with the convoy) was the cause, that my duties with so many wounded were all I could attend to."

He rejoined his regiment on June 11th, and was ordered down with another convoy on the 13th, to which, in accordance with general orders, a Lieutenant Deane, 38th Regiment, was attached. He notes :—

"Our passage down the Mondego was not agreeable, the storm was terrific with thunder and lightning, rain and wind; the river bottom is a shifting sand, and we were often aground; every flash of lightning caused the man at the wheel to let go and cross himself, calling on St. Antonio. Poor Deane died a few days after from the effects of this exposure."

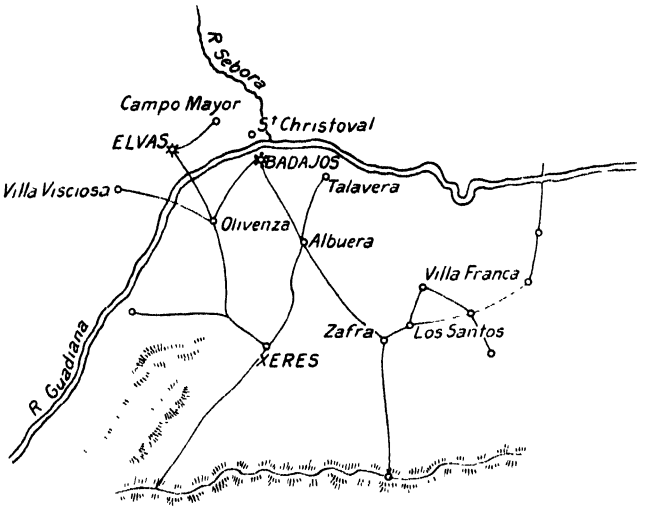
Ciudad Rodrigo.

On January 8th, 1812, they marched to Gallegos on the way to Ciudad Rodrigo, where he was placed in charge of the General Hospital, and had a fine view of the assault. After the city had been carried on the 19th he took down a convoy of sick and wounded to Castinhera, and rejoined the regiment at Villa Formosa. The assault at Badajos began on March 25th, and for some days he was doing duty at the St. Clara Hospital at Elvas, but proceeded to the front on April 5th, where he notes :—

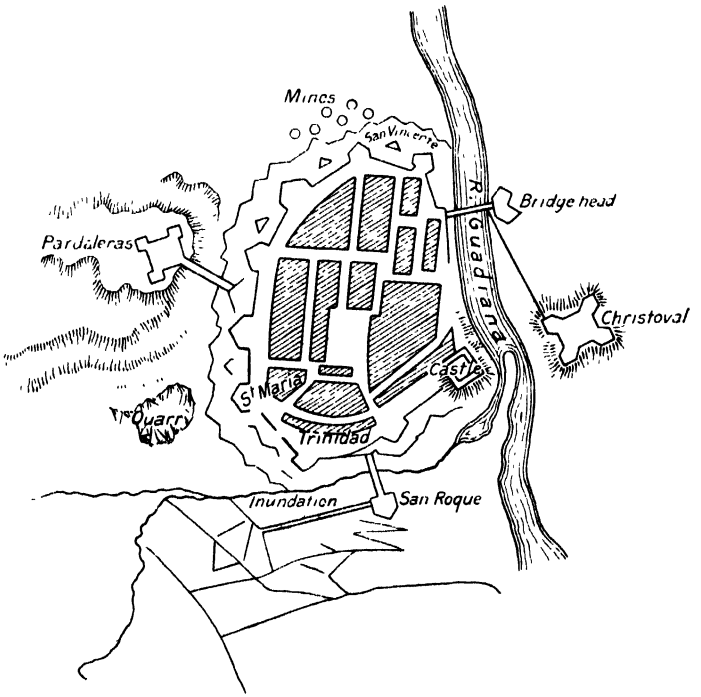
"Badajos.

"I received orders to attach myself to Staff-Surgeon Burnall. Went into the Batteries and saw some good practice in firing the heavy guns. Towards dusk we were ordered to advance with the Light and 4th Divisions, that were to attack the breaches and post ourselves near the part marked in Colonel Jones's map, 'The Quarry.' At 10 p.m. the assault began. The two divisions that marched up with us in such fine order were repulsed. The firing was tremendous, many of the musket shots from the walls passed us, and grape from Fort Pardaleras came rattling on the ground near. The two divisions retreated, completely

[1] *Vide* Route.



ENVIRONS OF BADAJOS



SIEGE OF BADAJOS

broken, the men and officers of every corps mingled together. As medical men we were useless; the badly wounded could not come to us and the slightly hurt would not remain under fire to be dressed. We heard great shouting and firing from the Castle, that Picton with the 3rd Division had assaulted by escalade, and carried. We also heard the bugles of Walker's Brigade (which had also escaladed on the Olivenza side).

"One of the staff came down and called on the two scattered divisions to reform and show a front, that the Castle was taken; some degree of formation took place and an advance. The town was ours by 5 a.m., and, it being full daylight, I entered the ditch and went up the breach. A most awful sight. The *chevaux-de-frise* of sword blades let into solid timber were on the top of the breach still standing; platforms of wood with large iron spikes chained lay on the front of the breach. In the bottom of the ditch a deep trench was dug, full of water, and many fell into it during the darkness. The dead and dying lay in every direction, and many, I think, were buried by the *débris* of the breach as they lay at its foot unable to move. All day we were employed in removing the wounded. I was ordered to do duty at the Convent of St. André. Many wounded were brought in immediately, but the whole were not for three or four days. Each fatigue party sent in from the front brought a certain number of wounded, but instead of returning for others they went off plundering. There was no control; the goods, chattels, and persons of the inhabitants were alike made free with. My horse and valise were stolen, and it was not till two or three gallows were erected in the chief square that the plundering was stopped. From fifty to sixty females, friends of the Spanish Colonel in whose house I was staying, came under my protection. Our loss during the siege and assault was near 5,000 killed and wounded. I remained in Badajos till April 18th,[1] when I was ordered to rejoin my regiment, now on its way to the north.

"July 20th.—'Canizal.' A fine morning. The division formed in lines and advanced. Soon after we perceived the French Army marching on a ridge of hills on our right, and orders were given to retreat. Nothing could be finer; we were moving in parallel lines in sight of one another, we could distinctly see the different French regiments on the opposite heights; now and then, as opportunity offered, a cannon shot was delivered on either side, but the whole day's march passed without a collision, although every moment expected. It was a regular steeple-chase or cross-country march, and proved very tiresome and laborious. Early in the morning an allowance of rum had been issued to the men,

[1] In connection with this, see App. No. 2 from Wellington's Dispatches *re* Shortage of Officers.

and there being no water near they drank it raw; the consequence was most were half drunk. We marched in columns of brigades and halted at Val Verde.

"1812. SALAMANCA.

"July 21st.—Marched off at 3 a.m. through Morisco, forded the River Tormes at St. Marta, and, after marching a short distance, we bivouacked. Soon after halting a most tremendous storm of thunder, rain, and lightning took place; many of the cavalry and artillery horses of both armies broke loose. I believe I was nearly the only one that had my baggage so well up that I was able to throw some sheeting across a line like a gipsies' tent, and so obtained some shelter. The storm ceased, and never did a more glorious morn usher in a more glorious day than July 22nd. Before daylight both armies were in position; the whole morning was spent in movements. At 4 p.m. the action commenced, and before sunset every Frenchman was in full retreat. Our division was on the extreme left of our army and was not engaged, so I and my brother assistant, Burroughs, had a very fine view of the action. From our commanding situation we saw distinctly the attack of Pack and his repulse, and the beautiful advance of our lines of attack with their artillery at intervals. But we nearly paid dear for our curiosity, being covered by the dirt thrown up by some round shot fired at us. Our division commenced the pursuit of the retreating army.

"MADRID.

"August 14th.—The division entered Madrid, and encamped in the gardens of the Palace 'El Campo.' I entered the City. The French garrison, 2,000 picked men, retreated from 'The Retiro' to Fort La China, but, preparations being made to cannonade them with hot shot, they surrendered as prisoners of war. I saw them march out, and among them the savage old colonel and adjutant, who had treated us so harshly when prisoners in the Retiro after Talavera. I visited and showed some of my brother officers the dungeon in which I had been confined."

The army left Madrid on August 30th, marching towards Valladolid in pursuit of the enemy, and arrived near Burgos on September 18th. The siege commenced on the 19th.

"BURGOS.

"October 2nd.—I had been in medical charge of the regiment since Wylde's appointment to the 4th Dragoon Guards (March 2nd, 1812). The new surgeon arrived this day, my old friend and fellow-prisoner Herriot. I was now ordered to take charge of the hospital at Villa Toro for receiving the wounded during the siege, and I continued so during the whole time, a very severe duty, having no assistance (one or two young Spanish surgeons were sent to assist at the latter portion). The

operations were continued to October 21st, and my surprise was very great when at 4 p.m. that day I was ordered to send off every man that could be moved, and to clear the village of wounded officers. Shortly after Deputy Purveyor Hodges arrived, and informed me that I was to remain in charge of such wounded at Toro as could not be moved. On my objecting to the duty, having been before left with the wounded at Talavera, Dr. McGrigor went to his Lordship, the Duke of Wellington, who agreed with me, but stated that if I remained I should have my promotion, to which I agreed. (Whilst on this duty I slept in the sacristy of the chapel, where the hospital was established. My ague returned, and I was far from well, and one day, whilst in the paroxysm of ague, lying between blankets, his Lordship, the Duke of Wellington, came into my room and talked with me.)

"October 22nd.—Early in the morning I saw the last cavalry picquet of our army retire. I waited the whole day in great anxiety for the arrival of the advanced guard of the French army, for I was left alone with the wounded and my Portuguese servant; a couple of stragglers from the Guards came in, and I made them useful in assisting me. About half-past five in the evening some cavalry approached the village; I attracted their attention, and an officer and party came towards me. I was taken to General Foy, who was very polite, and asked me to dine. At my request he sent me a safeguard. During the night many officers of the 1st and 7th French Divisions passed their time in my room; we talked much on politics. A French surgeon took a great fancy to my case of capital instruments, and left me his old ones!! My charge consisted of eighteen British and seven French wounded, but the French left some more the following day.

"October 23rd.—The two divisions of the French army marched off, leaving me two Gendarmes for the protection of the hospital, but they very soon proceeded to Burgos, not liking the prowling Spaniards.

"October 24th.—Having waited with the greatest impatience, and no communication coming from Burgos, I went into the city and waited on the Commandant de la place. He said he had received no advice of my being at Villa Toro, and hoped the Commissary would send for the wounded that evening. He did not wish me to return to Villa Toro, but I represented that my baggage was there, and that the wounded required my assistance. He at last gave me a pass. He told me that as the Marquis Wellington had detained the French surgeons at Coimbra, he supposed I should be sent to France, though I told him that General Foy had promised me to be permitted to return to the British head-quarters. I returned to Villa Toro in bad spirits and health.

"October 25th.—No cars have arrived, nor any communication from the city; no rations, so purchased bread and chocolate for the wounded.

"October 26th.—No cars. In the evening I again went to Burgos, and seeing General du Bretton in the Public Mall, went up to him and

explained my situation at Villa Toro, with so many persons without comforts or even rations. He was greatly displeased with the Commandant, abused him well, and assured me they should be brought in the next morning.

"October 27th.—At last, about 3 p.m., some cars arrived, but not in sufficient number to carry off all the men. They had a strong escort of cavalry and infantry with them, and were to return again that evening. The Intendant of the French Hospital wished to borrow my horse, but that I objected to. He appeared greatly annoyed at my refusal, and wanted me to proceed forthwith to Burgos; but, "as the whole of my charge were not removed, I would not."

"ESCAPE FROM BURGOS.

"October 28th.—In the morning I again went to Burgos to report I had still four men to remove. The Commandant said the cars should be off at once for them. He desired me to call in the evening to sign my parole as prisoner of war. This was a death-blow to me, and I immediately went to Captain Menzies, a wounded officer in Burgos, to ask his advice about attempting to escape. He advised me not to try, as my health was so delicate; he thought I could not go through the fatigue. Some officers of the German Legion, however, were of a different opinion. Seeing the cars ready to start, I had no time to lose. I bought a bottle of brandy and two pounds of meat, and rode to the gate. The sergeant of the guard wished to detain me, but I showed him my pass of the 24th, which he did not examine minutely, and talking of Verdun, where his regiment had been quartered, he allowed me to pass. On arrival at Villa Toro, I got my horse and mule ready, with my Portuguese boy mounted on the latter, and, seeing the cars approaching, I took a dose of brandy and started off at a gallop. After a good ride over flat but partly ploughed land, I came to a village at the foot of the mountains. The inhabitants told me they were sure the French would not follow me up the mountain; so I ascended, and at the top halted, and with my glass distinctly saw some French cavalry in the village I had just left. I immediately struck off the high road, and, judging as well as possible my proper direction, I continued on till dark, when I fell in with a peasant, whom I compelled to show me the way to the priest's house in the village of Massa. The priest gave me a good supper and forage for my beasts, and, having rested till 2 a.m., I proceeded on my way to Aquillo-de-Campo, my intention being to reach the coast at Santander, as I knew Sir Home Popham and some English vessels were there. I arrived at Aquillo-de-Campo on the 29th, at 5 p.m. It was as much as I could do to keep my horse on his legs. Here I found some Spanish troops, and obtained a good billet. I proceeded on my journey, passing through Reinosa, where I had coffee with the Spanish General Renovales, who informed me that Soult had joined Joseph, and that they had advanced on Madrid, that

General Hill had retired, and that Wellington and Hill would unite. On arrival at Santander, on November 2nd, I made the best of my way to Sir Home Popham's quarters, and put him in possession of all I knew of the raising of the siege of Burgos and what I had heard of the evacuation of Madrid. He was quite unacquainted with these facts, and thought them so important that he made up his mind to despatch a frigate to England with the intelligence. Of course, he catechised me closely. I then asked him for a passage to England, as I thought it would be a long and very unsafe journey to attempt to reach Wellington's head-quarters. I sold him my horse for £25 (he afterwards sent for the saddle as well, a first-rate London one. He was, in my case, a great hand at a bargain). He introduced me to Captain Seymour, of the 'Fortunée,' frigate, of whom he had obtained my passage. I dined at the Royal Marine Mess.

"November 3rd.—Embarked for Plymouth, which we reached after a fine passage in five days. During the voyage nothing could have been kinder than Captain Seymour's attention to me, as also the officers, and especially the Marine officers. They told me at parting that they had expected to have to drop me overboard before the end of the voyage."

"November 16th.—Waited on the Adjutant-General in London[1] and was by him sent to see Lord Bathurst, Secretary of State, to whom I repeated the information I had furnished to Sir Home Popham; (my report had been received in London on November 10th. Lord Wellington's despatch, with the news of the raising of the siege of Burgos and Hill's retreat from Madrid, did not arrive in London till a week after, so that the news I brought was important). Being still very weak and wretchedly thin, I obtained one month's sick leave.

"December 24th.—Joined the depot of 24th Regiment at Maldon, in Essex (four companies having been ordered home). . . . I now memorialed the commander-in-chief, through my commanding officer, for promotion. The Duke of York's reply was the copy of the Director-General's answer to him, who stated that my service was so short and there were so many senior to me that he could not notice my claims except I was on a foreign station. I also sent a report to Dr. McGrigor in Spain, detailing how I had fulfilled the duty I was placed on at Villa Toro and claiming the fulfilment of the promise of the commander of the Forces, of promotion.

"1813.

"March 14th.—I was agreeably woke this morning with the intelligence of my being promoted to the surgeoncy of the 30th Regiment, my letter to Dr. McGrigor having succeeded, and I was directed to join the depot at Berwick-on-Tweed."

[1] Letter from A. G. (*vide* Appendix No. 2.)

1814.

He joined the 30th Regiment on May 13th, went with them to Jersey, and on January 2nd, 1814, they embarked for Holland. During the voyage they were nearly wrecked off the South Foreland, but managed to get to Ramsgate, where they were transferred to another transport, and after an exciting voyage, in which they stuck on a sand-bank, and were again nearly wrecked by ice coming down the river, they reached their destination and disembarked on February 10th. The regiment proceeded to Brussels on May 12th, from where, on June 27th, they marched through Tournay and Oudenarde to Antwerp, where they arrived on August 6th. Here they remained in garrison until April 8th, 1815. During their stay in Antwerp a Military Society was formed, called "The First Military Society of the garrison of Antwerp," under the patronage of Major-General Sir C. Halkett, K.C.B., &c. The directors of the Society were :—

Lieutenant-Colonel W. Bailey, 30th Regiment.
T. de Fevre, Ag. A.C.G. and Principal Commissary.
Captain C. G. Napier, R.A.
Surgeon J. G. Elkington, 30th Regiment.
Lieutenant Fred Aldrick, 95th Regiment, D.A.B.M.G.

1815.

The only record concerning this Society that I have found among his papers is an invitation card and notice for a ball and supper to be given by the Society on January 31st, 1815, and he notes that the balls, concerts, plays, dinner parties and excursions seemed to make the winter pass rapidly. On March 9th they heard of Buonaparte's escape from Elba.

"April 8th.—We marched to Malines.

"June 15th.—The whole brigade was ordered to assemble at Soignes.

"Quatre Bras.

"June 16th.—At 2 a.m. we commenced our march on the road to Braine-le-Comte and proceeded later on to Nivelles. Shortly after 4 p.m. we advanced, and as we passed the wood of Bossu a staff officer whom I had known in the Peninsula came out of it, wounded in the foot. The firing was sharp in the wood and some of the balls came whizzing over our heads, so he would not dismount, and I bandaged him up on his horse. The regiment passed Quatre Bras, and proceeded some way down the Namur Road and entered some cornfields. It was certainly 5 o'clock now. Soon after there was an order to prepare to receive cavalry, and I fell back and stood on the Namur Road, with my hospital serjeant and

Bat horse having my instruments and medicines. I had the regiment in view, knowing it more particularly by the Adjutant, Andrews, having a white horse. On the road I received Colonel Hamilton of the regiment, wounded in the leg. He did not dismount while I dressed him. I also received Lieutenant Lockwood with a wound of a musket ball in the frontal sinus. I sent him to the farm at Quatre Bras, whilst here I saw the artillery on my right open fire on the advance of cavalry up the Charleroi Road. Shortly after the repulse of the cavalry I was ordered up to the front to some wounded of the regiment. I attempted to pass down the high road, but my horse would not pass the numerous dead men and horses of the French that lay in the road, and I entered the fields on my left and dressed some men at a farmhouse. I then returned to Quatre Bras and extracted the ball (as I thought) from Lieutenant Lockwood's frontal bone (but three weeks after a portion of it was found in the sinus and the trephine was used to extract it). During the evening —for it was now getting dark—I dressed many wounded, and was at last called to an officer who had received numerous wounds; after having dressed a number of them, I told him that none of them would kill him. He replied, "But look at this doctor," taking up his shirt. A lance had entered his side; it was only a muscular wound. On my telling him that would not settle him, he opened his eyes and recognised me and said, 'Do you really think, Elkington, I shall live?' I then sponged his bloody face, and found it was my old friend Menzies, of the 42nd, that I had left at Burgos with a compound fracture.

"June 17th.—Early in the morning all our wounded were sent to the rear, and about noon the army retreated. During the retreat we encountered a most severe thunderstorm with heavy rain, and perhaps I may safely say, that a more severe night was never experienced by the British army, who were lying out in cornfields up to their knees in mire. Colonel Vigoreaux and myself lay together, having my hospital panniers to windward, our only shelter.

"1815.—WATERLOO.

"June 18th.—Early in the morn it began to clear; the men and officers were actually benumbed, being so saturated with the wet. After a little running about, wringing their blankets, and the issue of some spirits, the circulation returned, and by 10 o'clock the muskets were all in good order. We could now distinctly see the movements of the different French corps. At noon the action commenced. The artillery in front of our brigade opening fire on the enemy, advancing on Hougomont (I took out my watch as this took place). About 7 o'clock in the evening the final attack by the Imperial Guard was made, and, being repulsed, the whole French army was soon in full retreat and in inextricable confusion. I remained at Mount St. Jean looking after the wounded till June 21st, by which time I had sent off every man of my regiment to

Brussels. I rode over the field to report on the number of French wounded still to be removed. At La Haye Sainte I found numbers of badly wounded. Those able to walk made the best of their way to Brussels. The transport was not sufficient to remove the British; the different pieces of French Artillery as they were brought to the rear were loaded as well as possible with these unfortunate beings—(a day or two after a general action is the period to gain a fine idea of the miseries of war). The inhabitants were now returning to collect what little remained of their household property, for friends and foes had made free with everything they wanted. Their houses were so filled with wounded there was no room or shelter for them. The bodies of the dead began to be offensive, and the whole air was contaminated from the numerous carcases of men and horses. Peasants were employed to collect the bodies of the men to burn, and bury the horses, having their nostrils covered with handkerchiefs to mitigate the stench."

He left Mount St. Jean, where he had been looking after the wounded, on June 21st, and rejoined his regiment near Baray, whence they left for Paris on June 24th, arriving on July 7th, and encamping in the Bois de Boulogne. Here they remained till the end of October; the regiment embarked for home on December 25th, landing at Cork on February 1st, 1816, and marched for Limerick.

This ended his actual war service. He continued serving in Ireland with the 30th Regiment until his Battalion was disbanded on April 28th, 1817; and while at Tralee he was attacked with severe deep-seated ophthalmia of the left eye, which eventually led to loss of sight of that eye. For this he was granted a pension in 1819.

On being placed on half-pay he spent some time at Edinburgh attending classes, and then set up practice as a surgeon in Bath.

"1820.

"December 1st.—Ordered by the *Irish* Medical Board to join the 35th Regiment at Cork. Declined the appointment.

"December 9th.—Ordered by the *English* Medical Board to hold myself in readiness for foreign service.

"December 10th.—Went to London, saw Sir James McGrigor, and got a favourable answer as to my remaining on half-pay.

"1821.

"July 19th.—This morning I was greatly surprised by the first intimation reaching me that I was Gazetted Surgeon to the 1st Royal Regiment. I applied to be allowed to remain on half-pay, but this was refused.

"October 15th.—Joined the 1st Regiment at Newry."

After five years with the Regiment, in various stations in Ireland,

he accompanied them to Barbadoes. He appears to have had his usual luck while on the voyage out, for he notes :—

"1826.

"January 15th (1826).—Thick weather. This night we ran down a large schooner from the Azores laden with fruit. As she was for some time entangled with our anchor, the crew escaped on board us. One man had his leg crushed, and in a few days I was obliged to amputate it. This in a heavy sea and in one of the most rolling vessels I was ever in, was very awkward. I was obliged to be lashed to the foot of the table; however, the poor man did well. He was on crutches before we arrived at Barbadoes."

1828.

After a year in Barbadoes he obtained leave of absence, and while on leave was posted to the depôt of the regiment at Glasgow; in September, 1828, he was appointed Surgeon to the 17th Light Dragoons, which regiment he joined in Ireland in December. He remained with them until March, 1841, when he was appointed Staff-Surgeon to the Royal Hibernian School, Dublin, where he remained till his death in October, 1853.

APPENDIX I.

Record of Service.

Hospital Mate, August 8th, 1807, to July 6th, 1808.

Assistant Surgeon 24th Regiment, July 7th, 1808, to March 10th, 1813.

Surgeon 2nd 30th Regiment, March 11th, 1813, to July 24th, 1817.

Half-pay 30th Regiment (on reduction of Battalion), June 25th, 1817, to July 12th, 1821.

Surgeon 1st Battalion 1st Royal Regiment, July 12th, 1821, to September 10th, 1828.

Surgeon 17th Lancers, September 11th, 1828, to March 4th, 1841.

Staff-Surgeon Royal Hibernian Military School, March 5th, 1841, to October 3rd, 1853 (the date of his death).

War Services.

Capture of Madeira, 1807.

Peninsula from April, 1809, to November, 1812; at the Battle of Talavera, left in charge of wounded, made a prisoner of war; released in May, 1810, and rejoined the army in Portugal on its retreat from Busaco.

Present in the Lines of Torres Vedras, at the battle of Fuentes D'Onoro, Sieges of Ciudad Rodrigo and Badajos, battle of Salamanca and the capture of Madrid; during the siege of Burgos was in charge of the hospital, and on the retreat of the army was again left behind with wounded (managed to escape).

Served in the campaign in Holland, 1814 and 1815, present at Quatre Bras, Waterloo, and the capture of Paris.

APPENDIX II.

LETTER FROM THE HORSE GUARDS ON HIS RETURN TO ENGLAND AFTER ESCAPING FROM BURGOS, DATED NOVEMBER 13TH, 1812.

SIR,—I have received your letter of yesterday reporting your having made your escape from the enemy (whose intention it appeared to be to detain you, contrary to the custom of war), on the 27th ult., which I will immediately lay before the Commander-in-Chief.

As we have been disappointed in not having received intelligence from Burgos, on the Marquis of Wellington marching from the neighbourhood of that city, I shall be much obliged to you if you will furnish me with any information in your power in regard to the situation of the officers who have recently been wounded before the Castle of Burgos; and if you would particularise such as have fallen into the enemy's hands. I beg you to give me every information in your power respecting Ensign Knox of the 3rd Regiment Foot Guards, reported to be severely wounded in the head. I have the honour to be, Sir,

Your humble servant,

HARRY CALVERT,

J. G. Elkington, Esq. A. G.

In connection with the Medical Department of the Army, the following extracts from Lord Wellington's despatches are of interest[1]:—

"(1) No. 332. To the EARL OF LIVERPOOL. Badajos, November 14th, 1809.

"THE INSUFFICIENT MEDICAL STAFF.

"It is besides very necessary that some effectual measures should be taken to increase the medical staff, not with gentlemen of rank, but with hospital mates. The duty of the general hospitals in every active army ought to be done by the General Medical Staff, and the regiments ought to have their surgeons and assistants entirely disengaged for any extraordinary event, or sickness that may occur. We have not now one surgeon or assistant with each regiment, instead of three, the others being employed in the hospital instead of hospital mates, and we have always been equally deficient. Indeed, one of the reasons which induced me to cross the Tagus on August 4th, instead of attacking Soult, was the want of surgeons in the Army, all being employed with the hospital, and there being scarcely one for each brigade; and if we had had an action, we should not have been able to dress our wounded."

"(2) No. 480. To Dr. FRANK, CORTASCO, January 7th, 1811.

PRAISE OF THE MEDICAL DEPARTMENT.

". I have no objection to your making any use you think proper of this and my former letters; and you may be assured that I

[1] Selections from Wellington's Dispatches. Gurwood, 1851.

shall be happy to avail myself of every opportunity of bearing testimony to the zeal, ability, and success with which the duties of the Medical Department of this army have been invariably carried on under your superintendence."

RE PROMOTION OF MEDICAL OFFICERS.

"(3) No. 685. To Earl BATHURST, Villa Toro, September 27th, 1812.

"I likewise beg to draw your Lordship's attention to the practice of the Medical Board in promoting to vacancies in this army. Instead of promoting the officers on the spot, who deserve promotion highly from their merits and services, officers are selected in England, the Mediterranean, or elsewhere, to be promoted. The consequence is increased delay in their arrival to perform their duty, and all who do arrive are sick in the first instance.

"It would be but justice to promote those on the spot who are performing the duty, and we would enjoy the advantage, and the seniors of the Department at least would have experience in the disorders of the climate, and of the troops serving in this country; to which climate they would have become accustomed."

PROMOTION OF MEDICAL OFFICERS.

"(4) No. 711. To Colonel TORRENS, Badajos, December 20th, 1812.

"I enclose some letters which I have received from Dr. McGrigor regarding certain promotions made by the Medical Board. I entirely agree with Dr. McGrigor in opinion, that it is no encouragement to those who are performing their duty with the army in this country to see that when by their merits and exertions they have attracted the notice of their immediate superiors, and of the officers under whose command they are serving, and have been recommended for promotion, others have been preferred to them who have quitted the arduous service on which these have remained, probably to solicit from the Medical Board the promotion which these have been found to deserve by their exertions. The officers promoted by the Medical Board (one of them, Mr. Higgins, I know is) are meritorious; but neither deserve promotion equally with either Dr. Tyce or Mr. Guthrie. I have frequently made you acquainted with my sense of the inconvenience felt by the constant change of the officers employed by every branch of the Service in this country. One of the principal causes of these changes is the practice of going to England to apply for promotion which ought to be acquired by service here; and I acknowledge that I do not see the utility of my forwarding the recommendations of the heads of departments of those officers whom they deem deserving of promotion, if to these recommendations are to be preferred the claims and applications of those who quit the Service here to go home to make them."

"Napier, in his 'History of the Peninsular War,' in commenting on the operations in Andalusia writes[1]:—

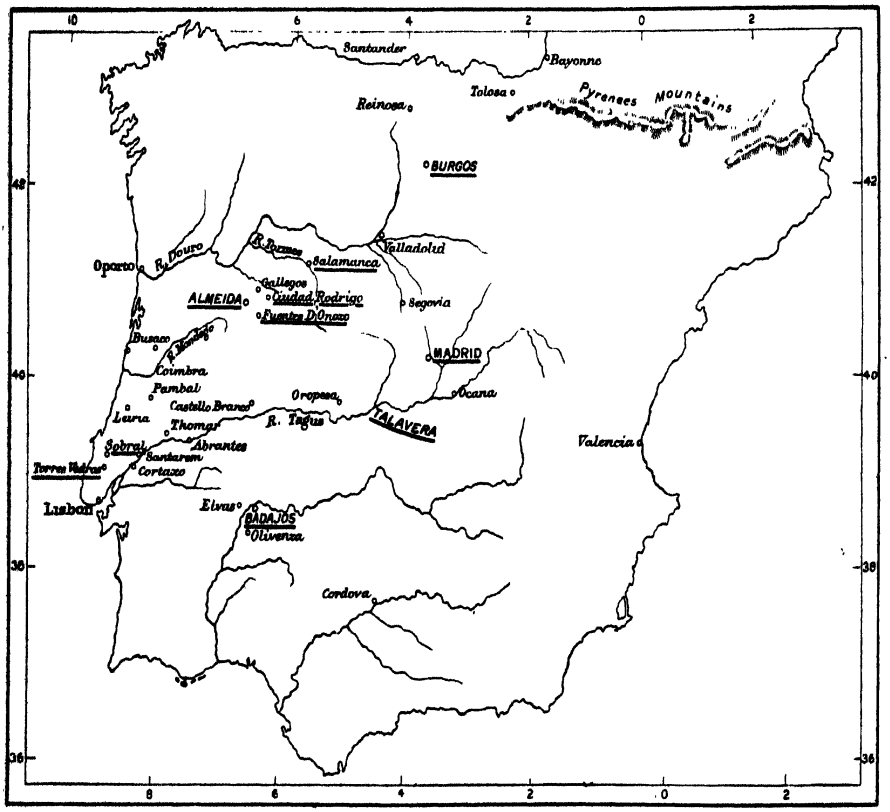
Re Medical Arrangements.

"All the hospitals in the rear were crowded, and Salamanca itself, in which there were 6,000 sick and wounded, besides French prisoners, was the very abode of misery. The soldiers endured much during the first two or three days after the battle, and the inferior officers' sufferings were still more heavy and protracted. They had no money, and many sold their horses and other property to sustain life; some actually died of want, and though Wellington, hearing of this, gave orders that they should be supplied from the purveyor's stores in the same manner as the soldiers, the relief came late. It is a common yet erroneous notion that the English system of hospitals in the Peninsula was admirable, and that the French hospitals were neglected. Strenuous and unceasing exertions were made by Lord Wellington and the Chief of the Medical Staff to form good hospital establishments, but the want of money, and still more the want of previous institutions, foiled their utmost efforts. Now there was no point of warfare which more engaged Napoleon's attention than the care of his sick and wounded, and he, being monarch as well as General, furnished his hospitals with all things requisite, even with luxuries. Under his fostering care also Baron Larrey justly celebrated, were it for this alone, organized the establishment called the hospital or 'ambulance,' that is to say, wagons of a peculiar construction, well horsed, served by men trained and incorporated as soldiers, and subject to a strict discipline. Rewarded for their courage and devotion like other soldiers, they were always at hand, and, whether in action or on a march, ready to pick up, to salve, and to carry off wounded men; and the astonishing rapidity with which the fallen French soldiers disappeared from a field of battle attested the excellence of the institution.

"But in the British Army, the carrying off the wounded depended partly upon the casual assistance of a weak wagon train, very badly disciplined, furnishing only *three* wagons to a division, and not originally appropriated to that service; partly upon the spare commissariat animals, but principally upon the resources of the country, whether of bullock carts, mules, or donkeys, and hence the most doleful scenes after a battle, or when an hospital was to be evacuated. The increasing numbers of sick and wounded, as the war enlarged, also pressed on the limited number of regular medical officers; and Wellington complained that when he demanded more, the Military Medical Board in London neglected his demands and thwarted his arrangements. Shoals of hospital mates and students were indeed sent out, and they arrived for the most part ignorant alike of war and their own profession; while a heterogeneous mass of purveyors and their subordinates,

[1] Second Edition, vol. v., Book 19, p. 248, August, 1812.

acting without any military organization or effectual superintendence, continually bade defiance to the exertions of those medical officers, and there were many whose experience, zeal, and talents would, with a good institution to work upon, have rendered this branch of the Service most distinguished; nay, many even of the well-educated surgeons sent out were for some time of little use, for superior professional skill is of little value in comparison of experience in military arrangement. Where one soldier dies from the want of a delicate operation, hundreds perish from the absence of military arrangement."



Map of portion of Spain and Portugal showing the principal places mentioned in the Journal during the Campaigns 1808, &c.

Reviews.

NOTES FOR MEDICAL OFFICERS ON FIELD SERVICE IN INDIA. By Major T. H. Goodwin, R.A.M.C. Bombay: Thacker and Co. Pp. 28. 4¾ in. by 6½ in.

Major Goodwin first gives the field service establishments of the various units and then the allotment of field hospitals; he next states the steps which a medical officer should take when detailed for service in the field with a regiment, or in charge of a field hospital, as also his duties and responsibilities during the campaign. This portion should be particularly valuable to any medical officer proceeding on service in India for the first time.

The *personnel* of a field hospital is then given by sections; the headings of the columns on page 9 are a little confusing and it would have been better if the compiler had used the headings "1 Section," "2 Sections," &c., instead of "1st," "2nd," &c.; under tentage and baggage this plan has been adopted. The list of boxes and packages with their contents is most useful as any one will agree who has had to uncord several packages in the dark in order to find some particular article. Details of troop trains and road spaces are given, and may be of interest in staff rides; on active service, however, the former are arranged by the railway authorities and the roads soon come to an end. The list of returns to be rendered in the field should prove of value, especially if the senior assistant surgeon's memory is not so good as that of the principal medical officer's clerk. Baggage, servants and the composition of field rations are clearly given. The "Notes" also include a *précis* of the Geneva Convention, but, alas! the frontier tribesman is notoriously unconventional.

Major Goodwin does not claim any originality for his "Notes," but in compiling them he has rendered his brother officers a very considerable service.

C. E. P.

A TEXT-BOOK OF MEDICINE. By G. Dieulafoy (translated by Collins and Liebmann). London: Baillière, Tindall and Cox. 2 vols. Price 25s. net.

This is a translation of the fifteenth edition of Dieulafoy's "Manuel de Pathologie Interne." That the French version should have reached the fifteenth edition is sufficient evidence of its popularity in France, and English readers will find it interesting as an exposition from the French point of view of the practice of medicine. The book is written with all the eloquence which characterises French medical works, and which makes them so readable; the translators have preserved, to a great extent, the characteristics of the original work in this respect. Some of the chapters are exceptionally good, and, to mention one only, the article on Appendicitis could be read with profit by everybody.

W. S. H.

TROPICAL MEDICINE AND HYGIENE. By Daniels and Alcock. Part II.: Diseases Due to Metazoa. London: Bale, Sons and Danielsson, Ltd., 1910. Pp. viii. and 283. Price 7s. 6d. net.

A review of the first part of this work has already appeared in a recent number of the Journal. The present volume deals with diseases due to

worms, arthropods, and flies, and it finishes with a chapter on snakes and snake-venom by Colonel Alcock. Great stress is laid on the zoological details of the various animals, and as a book on tropical parasitology so far as the animals dealt with are concerned, it should be very useful. The clinical side is not so good, and in some places the writers have assumed a knowledge of tropical medicine on the part of their readers which it is the very object of such a book as this to supply. The illustrations are, for the most part diagrammatic, and the book would have been much improved if pictures of such things as eggs had been given more or less as they appear when seen under the microscope instead of diagrammatically.

W. S. H.

SYPHILIS: ITS DIAGNOSIS AND TREATMENT. By Colonel F. J. Lambkin, R.A.M.C. London: Baillière, Tindall and Cox, 1910. Pp. vii. and 195. Price 5s. net.

In the preface to this book Sir Frederick Treves remarks: "Colonel Lambkin's experience has been so exceptional that it may be claimed for him that in a department of practice to which he has devoted the best years of his life he speaks with an authority which cannot lightly be put aside." While fully endorsing this statement one cannot but feel some disappointment in reading the work under review. This is partly owing to the author having endeavoured to compress too much matter into a very limited space. It is manifestly impossible to write exhaustively on the pathology, clinical course, diagnosis, prognosis and treatment of syphilis in a book of 187 pages, especially when the history of the disease and a description of its quaternary manifestations are also dealt with. The result of an attempt to do so is that many important subjects have to be treated in a more or less sketchy manner, and a student of the disease would be well advised to study a more detailed account of many points which here receive all too brief notice. Some useful notes on differential diagnosis are presented, and the description of the course of the disease is evidently the result of careful clinical observation. The whole of the chapters on treatment will probably require revising, if not re-writing, in the light of the marvellous results which have been obtained by the use of Hata (606). These results almost justify one in believing that the account of older therapeutic methods will shortly be of little more than historic interest. Seeing the enormous amount of excellent work done by the author, and the great increase of army efficiency which has resulted from his teaching and precepts, it may appear somewhat ungracious to insist on this probability here; but one can only speak of things as they are, and Colonel Lambkin would be the first to recognise the importance of the discovery of this new drug and the benefits likely to arise from its extended use.

THE ARMY MEDICAL SERVICE IN WAR. (*Behelf zum Studium des Militär-sanitätswesens an den k. u. k. Korps-offiziersschulen.*) By Oberstabsarzt Dr. Cron. Pp. 51, with 6 figures. 9¼ in. by 6 in. Vienna, 1910. Safar. Price 1s.

This pamphlet has been issued under the auspices of the General-Inspectorate of the Austrian Army Corps Officers' Schools in order to

furnish officers studying there with a concise sketch of the duties and working of the medical services in war.

The first nineteen pages deal with military hygiene in so far as a regimental officer should be acquainted with the subject; general rules are laid down as to the value of different foodstuffs, the necessity for having a pure water supply, the conduct of marches so as to avoid undue exhaustion of the troops, and the dangers from infectious diseases.

The second portion of the book discusses the medical problems of war and the employment of medical units under varying conditions in so far as the subject concerns the regimental officer. Some useful information is given, as for instance the probable loss to the army by reason of sickness or other disability during the period of concentration and advance, and the probable number and severity of the casualties in different kinds of engagements. The duty of searching a battlefield after an engagement is discussed, as also the points to be borne in mind when selecting regimental aid-posts.

C. E. P.

E. MERCK'S ANNUAL REPORT. 1910. Vol. xxiii., pp. 347. Price 1s. 6d.

This work, besides being a catalogue of Merck's preparations, contains a great deal of matter of scientific interest. The first eighty-four pages deal with serum therapy and bacterio-therapeutic preparations. This section begins with an introduction in which the various complicated bodies which may be produced in the blood as the result of inoculations or disease are clearly and concisely described; this portion will be found to be of the greatest assistance to anyone who finds a difficulty in understanding the mechanism of protective vaccination, Wassermann's serum test, the action of therapeutic sera, &c.

The book then goes on to discuss special sera and gives much useful information on the preparation, standardisation, dosage, &c., together with abstracts from and references to all the recent literature on each particular preparation. This should be invaluable to anyone, not a specialist, who may suddenly be called on to treat an urgent case by means of serum injections, with the use of which he may not happen to be very familiar.

The second part of the book deals with chemical preparations and drugs. Most of the drugs in this section have only recently been introduced, and published reports as to their value, or otherwise, in the treatment of any particular disease are not always easily obtainable; this work will supply references to all the most recent literature on the subject. Notes are also given on the use of some of the older drugs for the treatment of diseases other than those for which they were formerly employed, *e.g.*, injections of quinine in syphilis.

The book is published in English and a few copies will be supplied free to medical men on application to Merck's London office, 16, Jewry Street, E.C.

C. E. P.

Current Literature.

Reports on Plague Investigations in India.—*Extract from the Journal of Hygiene*, vol. x., No. 3. The following statement embodies the chief conclusions which have been provisionally reached by the Advisory Committee as the result of the investigations made under their direction from 1905-1909 into the mode of spread of plague in India.

(1) Considerable epidemics of human plague consist almost entirely of cases of bubonic plague and are directly dependent on the occurrence of epidemic plague in rats. The development of the rat epidemic precedes the human epidemic by an interval of about a fortnight. There is no evidence that any animals except rats play an important part in plague epidemics.

(2) *Epidemic Plague in Rats.*—(*a*) Rat-fleas which have sucked the blood of a plague-infected rat can transmit the disease to healthy rats to which they are transferred. The plague bacilli multiply in the stomach of the flea, and the flea may be still capable of conveying infection three weeks after having imbibed plague-infected blood.

(*b*) If plague-infected rats are kept in close confinement along with healthy rats, no epidemic of the disease occurs in the absence of fleas. In the presence of rat-fleas the disease spreads from the infected to the healthy animals, and the rapidity and severity of the epidemic so produced is in proportion to the abundance of fleas.

(*c*) Rats may be infected by feeding them upon the bodies of other rats dead of plague. The distribution of the lesions in the bodies of naturally infected rats corresponds with that in rats experimentally infected by means of fleas and not with that in rats infected by feeding.

The Committee, therefore, conclude that in *Nature, plague is* spread among rats by the agency of rat-fleas.

(3) *Epidemic Plague in Man.*—(*a*) Bubonic plague is not directly infectious from man to man as is shown by the experience of plague hospitals where there is no tendency for the disease to spread from the sick to the attendants.

(*b*) Material epidemics of plague in man are always associated with epidemic plague in rats. Epidemic plague among rats provides a large number of infected rat-fleas, and, owing to the mortality among the rats, these fleas transfer themselves on to human beings.

(*c*) Rat-fleas (*Pulex cheopis*) bite human beings, especially in the absence of their natural host.

(*d*) Rat-fleas containing bacilli, and found capable of transmitting plague to animals, may be caught in plague-infected houses.

(*e*) Animals susceptible to plague (guinea-pigs, monkeys) placed in plague-infected houses, if unprotected from fleas, may contract the disease; whereas such animals under the same circumstances remain free from plague, if protected from fleas.

(*f*) The Commission have also performed numerous experiments with a view to testing other possible modes of infection, and have found that:—

(i.) In the absence of fleas no epidemic resulted when animals sus-

ceptible to plague (guinea-pigs) were kept in close contact with infected animals, although the animals took their food off floors grossly contaminated by the excreta of their infected companions.

(ii.) Susceptible animals (guinea-pigs) caused to live upon and feed off floors artifically saturated with plague cultures failed to contract the disease.

(iii.) The excreta of plague-infected patients may contain plague bacilli, but the bedding, &c., of plague patients soiled with excreta containing plague bacilli was not found to be infective to highly susceptible animals caused to live in and upon the bedding.

The Committee, therefore, consider that in the great majority of cases during an epidemic of plague, man contracts the disease from plague-infected rats through the agency of plague-infected rat-fleas.

(4) *The Seasonal Recurrence and Spread of Plague.*—(*a*) The Committee has obtained no evidence that under ordinary conditions the plague bacillus survives for more than a few days outside the bodies of men, animals or fleas.

(*b*) In large towns plague may persist throughout the year, since a few cases of acute plague in men and rats occur during the non-epidemic plague season.

(*c*) In villages there is no satisfactory evidence that such persistence is of other than exceptional occurrence, and it seems probable that the recurring annual epidemics in such places are due in most cases to fresh importation of the infection.

(*d*) There is no evidence that plague infection is carried for more than short distances by the spontaneous movement of rats. Plague appears to be commonly imported into a fresh locality about the persons of human beings, though the transference of infected rats and fleas in merchandise must be considered.

(*e*) In districts which suffer from annual epidemics of plague, the rat epidemic, on which the human epidemic depends, occurs during some part of that season when the prevalence of fleas is greatest.

Orange-red Underclothing Test.—Report of the Work of the Board for the Study of Tropical Diseases in the Philippines. Reprinted from *Military Surgeon*, vol. xxvii., No. 2. During the quarter the tests of the orange-red underclothing, which have been under way for over a year, were completed, and the work of compiling the great amount of data obtained from these observations was carried out by Captain James D. Phalen, Medical Corps, who has submitted an extensive special report on the subject. A summary of the work is as follows :—

"The test of the orange-red underwear and hat-linings was undertaken as a result of recommendations by the Inspector-General of the Army. The garments were prepared at the Philadelphia depôt of the Quartermaster Department, and were of a deep orange-red colour. The shirts averaged $\frac{1}{5}$ of an ounce heavier than the white ones worn by the controls. The orange-red drawers were of a different type from the white ones, and averaged $1\frac{1}{5}$ ounces heavier. The garments faded materially on washing, especially if exposed to the sun while drying. However, the inner surface retained much of the dye, and it is not thought that the fading was so great as to destroy the value of the tests.

"It had been intended to equip 1,000 men with the special underwear,

and an equal number of controls with white, but owing to inability to fit sufficient men from the 5,000 suits furnished, it was found impossible to equip more than 500 with the orange-red garments.

"The men wearing the special clothing, and the controls wearing the white, were taken from the same companies, which were equally divided in such a way as to make the two groups as nearly as possible equal in physique. Those with long tropical service or who were exceptionally weak were excluded.

"The experiment was kept up during the calendar year of 1909, and a summary of the results is as follows:—

"(1) *Weight.*—There was a loss of weight during the year in both groups of men, more marked in the mid-year (hot season) weighings, a certain amount of the mid-year loss being made up by the end of December. The loss of weight at the mid-year observations was greater by an average of one pound for the orange-red group of men than for the control group. At the end of the period of observation there was no difference of weight in the two groups.

"(2) *Blood Examinations.*—The results in both groups agreed in character if not in degree with those of Captain Wickline, Medical Corps, showing an increase above normal in the number of red cells and a decrease in the percentage of hæmoglobin, the hæmoglobin index being necessarily still more diminished. The increase of red cells and the decrease of hæmoglobin were both more marked in the orange-red group than in the controls. Both this change and the greater loss in weight referred to, as well as the lower blood-pressure mentioned below, may have been due to increased perspiration on the part of the orange group during the hot season.

"(3) *Blood-pressure.*—The blood-pressure of both groups fell during the hot season, the fall being slightly more marked in the orange-red group. In December the pressure in both groups returned to practically the original point.

"(4) *Pulse, temperature and respiration* were taken after drill or other exercises, 8,000 observations being made. Averages for 1,500 observations are shown in the following table:—

	Temperature	Pulse	Respiration
Orange-red group	98·792	91·2	22·3
White group	98·780	90·9	21·3

"It will be seen that each is higher for the orange-red group than for the controls, but the differences are very slight.

"(5) *Comparative sick reports* showed insignificant differences. The admissions per 1,000 and the days lost per 1,000 were, respectively, 508 and 3,526 for the special group, and 478 and 3,522 for the white group. The admissions per 1,000 for heat exhaustion were higher for the orange-red group, 27 as compared with 21 for the controls.

"(6) *Strength Tests.*—Strength tests on men from the two groups showed nothing of value.

"(7) *Symptoms referable to Climate.*—The two groups suffered about equally from these, except as regards excessive perspiration, which was more complained of by the men of the orange-red group.

"(8) *Impressions of the Wearer.*—Sixteen men preferred the orange-red garments, 54 had no choice between the colours, and the remainder,

nearly 400, expressed an opinion adverse to the coloured underwear. Fifty said it was hotter, and 104 others stated that it caused more profuse perspiration.

"No organisation commander saw any benefit from its use, and of 16 officers who used it for a time only one expressed approval.

"(9) *Photographic Experiments.*—Experiments showed that the campaign hat was as impervious to the rays affecting the photographic plate without the orange lining as it was with it. The lining added materially to the opacity of the khaki cap. The differences in penetrability by actinic rays between a light skin and a dark Filipino were slight, and were entirely neutralised by one layer of khaki uniform cloth. The pigment of the darkest skin was found nowhere as protective as was the orange-red garment.

"(10) *Temperature Experiments.*—Extensive experiments, both on and off the body, showed that, when exposed to the sun, the temperature was greater beneath the orange-red material than it was beneath similar white material. The same was found to be true when both materials were overlaid by khaki cloth.

"(11) *Moist Heat Experiments.*—These were carried out at Los Banos in a room ranging from 90° to 98° F., and with the atmosphere saturated with moisture. Men remaining four hours in this room lost greatly in weight, and had a marked rise in temperature, with acceleration of pulse and respiration, and a fall in blood-pressure."

From the results of the whole test and the experiments, the conclusion was reached that the physiological effects of the climate in the Philippines can be, and probably are, produced by moist heat without the aid of the sun's actinic rays, and no evidence was found that the sun's rays alone could or did produce these effects. On the contrary, the test underclothing added materially to the burden of heat, which the system was compelled to endure, and which is probably the chief cause of tropical deterioration. Even if the actinic rays had any influence whatever on the system, it is believed that they are sufficiently excluded by the khaki uniform and the campaign hat.

Report on Back-to-back Houses.—Local Government Board (Dr. L. W. Darra Mair), 1910, Summary and Conclusions. The principal points of the foregoing report may be summarised as follows:—

(1) The comparison which has been made between through houses and "back-to-back" houses has been carried out so as to bring under review good types only of back-to-back houses, situated in healthy areas.

(2) The "through" and "back-to-back" houses thus compared were situated in thirteen industrial towns in the West Riding of Yorkshire.

(3) Every care was taken to select strictly comparable "through" and "back-to-back" houses, occupied by the same class of people, with similar occupations and wages. Nevertheless, the rent of the "through" houses was, on the average, appreciably higher than that of the "back-to-back" houses—the average rent of the former being 5s. 6d., and the latter 4s. 6d. per week.

(4) The vital statistics, which have been obtained regarding these areas, cover a period of ten years (1898 to 1907), and, on the basis of a special detailed census of each area, corrections have been made

throughout for differences in the age and sex constitutions of the populations concerned.

(5) The corrected average death-rate (annual) from all causes was greater in the "back-to-back" houses than in the "through" houses, to the extent of 15 per cent.

(6) The excess of mortality in "back-to-back" houses built in continuous rows was greater still, amounting on the average to a little more than 20 per cent.

(7) The corrected average annual death-rates from all causes in "through" houses and in "back-to-back" houses, possessed of means of side-ventilation (blocks of four), were about equal.

(8) The outstanding causes of death which produced the excess of mortality in "back-to-back" houses were:—

(*a*) Pneumonia, bronchitis, and other pulmonary diseases (exclusive of phthisis), and

(*b*) Diseases of defective development and of malnutrition in young children.

The corrected excess of mortality from each of these two groups of diseases, in "back-to-back" houses, approached 40 per cent.

(9) There was also some excess of mortality (10 per cent.) in "back-to-back" houses from infectious diseases, and a small excess (5 per cent.) from diarrhœa.

(10) Mortality from phthisis showed an excess, amounting to 12 per cent., in "back-to-back" houses built in rows, but not in "back-to-back" houses built so as to admit of side-ventilation (blocks of four).

(11) Although the average rate of mortality from all causes was about the same in "through" and "back-to-back" houses built in blocks of four, there was a large excess of mortality in the latter from pulmonary diseases (exclusive of phthisis), as was the case in "back-to-back" houses in rows, and also a large excess of mortality from the diseases of defective development and malnutrition in children.

(12) Approximately, the ages at which the excess of mortality in "back-to-back" houses occurred were the early ages of life, from infancy up to 15 years, and the late ages of life, from 65 years and upwards. At both of these periods of life, the predominating cause of the excess was mortality from pulmonary diseases, and at the early ages as well from diseases of defective development and malnutrition.

(13) At the age periods intervening between these two extremes, the relative excess of mortality in "back-to-back" houses was comparatively small. On the whole, therefore, it is reasonable to infer from the data given in this report that even in good types of "back-to-back" houses situated in healthy areas, the mortality from all causes is higher by 15 to 20 per cent. than in comparable "through" houses; but that this excess is not evident in "back-to-back" houses built with means of side-ventilation.

Furthermore, it may likewise be inferred that the chief sufferers from residence in "back-to-back" houses are infants, young children, and old persons, in consequence principally of the greatly increased liability of both young and old to death from pulmonary diseases (other than phthisis), and, of the young, to death from diseases resulting from defective development and malnutrition.

The excess of mortality from diseases of the lung in "back-to-back"

houses involved pneumonia and bronchitis to about an equal extent. Defective development includes premature birth and congenital defects, which are directly related to prenatal influences; as well as causes relating to influences affecting adversely the child post-natally—atrophy, debility, marasmus, convulsions, and teething.

Itch in Armies.—In the *Deutsch. Militärärzt Zeit.*, Sept. 26, 1910, Oberstabsarzt Klehmet gives an interesting historical review of the incidence and treatment of itch in armies. Up to the middle of the last century itch was a dreaded scourge in all armies. During the Seven Years' War itch was one of the commonest and most serious diseases; in many cases half the men of a regiment were in hospital at one time for this complaint.

Baldinger, a surgeon in Frederick the Great's army, has recorded the fact that he often saw soldiers whose whole body was covered with masses of greenish moss-like scabs, the result of itch. The disease was ascribed to foul emanations in the overcrowded hospitals, to the debilitated condition of the men, and to want of personal cleanliness and deficient perspiration. Everyone in the army from highest to lowest was sooner or later attacked by this disease. Owing to the universal custom of billeting troops on the inhabitants the civil population also suffered severely. Intimate contact with horses was supposed to be a certain preventive, as it was found that cavalry soldiers did not suffer to anything like the same extent as infantry men; the real explanation probably was that the cavalry were billeted in farms and not placed in barracks. In the seventeenth century Leeuwenhoeck had demonstrated the presence of the acarus in the lesions of itch. The leading pathologists of the day, however, clung to the theory that the pustules of itch were developed in consequence of changes in the body-fluids and that the parasite did not invade the tissues till the pustules afforded it a congenial habitat.

Wichmann published a monograph on the "Ætiology of Itch" in 1786; in this he gave good illustrations of the acarus and correctly ascribed the disease to the presence of this parasite. His views were not, however, accepted by the profession.

In accordance with the generally accepted views of the etiology of itch, treatment consisted of emetics, purgatives and other means intended to purify the blood; if the surgeon succeeded in curing a patient of itch in six months he was quite satisfied.

Jasse, a surgeon in the Bavarian army, in 1778, was the first army surgeon who is recorded as having employed external remedies. He used an ointment containing sulphate of zinc and sulphur and obtained excellent results without any of the dreaded complications which were supposed to follow any attempt to "drive in" the eruption. A similar treatment had been previously employed by Abraham à Gehema, but it had fallen into disuse. Pringle had also successfully employed a sulphur ointment in the English army. This treatment was soon generally adopted throughout the army.

All armies were more or less infected with itch, and Ardèche reports that Napoleon Bonaparte caught itch from a gunner whose place he took in the trenches at the siege of Toulon. As late as 1841 all bedding for itch patients in German military hospitals was marked with a "K"

(Krätze). The German regulations for military hospitals, issued in 1852, laid down the number of beds reserved for itch patients; this number was in general equal to one fifth of the whole of the accommodation.

In 1867 there were in the Prussian army 25,278 admissions (= 99·8 per 1,000) for itch.

In 1867, treatment by balsam of Peru was introduced. Burchardt showed that a thorough rubbing with this drug, followed by a second application ten days later, effectually destroyed the parasite. The general adoption of this plan of treatment was followed by a rapid diminution in the prevalence of this disease. The importance of having an ample supply of balsam of Peru with an army in the field is now recognised; each advanced depôt of medical stores holds 83 lb. of this drug.

With rare exceptions itch in the German army is now treated in barracks and the incidence has fallen to approximately 3 per 1,000.

C. E. P.

"Ehrlich-Hata," or "606," in the Treatment of Syphilis of the Internal Organs and Nervous System. — Professor H. Schlesinger (*Wien. med. Woch.*, November 12th, 1910) gave a lecture on the results he had obtained with this drug. In almost all cases these were extremely favourable, but he adds several cautions as to accidents which may occur when "606" is used in this class of case. Thus the pulse-rate is usually more or less increased, while at the same time there is a fall in blood-pressure. The quantity of urine excreted is diminished and œdema appears over the sacrum. The drug is contra-indicated in patients suffering from aortic obstruction or those in whom compensation has not been established.

The kidneys are commonly affected, albumin with granular and hyaline casts being found in the urine; these symptoms of irritation are, however, usually only temporary. In one or two cases of syphilis of the liver and meningo-myelitis, the patient's symptoms were aggravated as a result of the injection.

The other main contra-indications are degeneration of the nervous structure of the cord, aneurism, advanced age, leukæmia and diabetes. In advanced tabes or paralysis the drug is useless.

Professor Schlesinger, while paying tribute to the great value "606" in the treatment of syphilis, says that it will not entirely displace mercury and iodide of potassium for cases in which the viscera or nervous system are affected.

C. E. P.

"Ehrlich-Hata," or "606" (*Wien. med. Woch.*, November 12th, 1910).—At a meeting of the "Gesellschaft für innere Medezin und Kinderheilkunde," Professor Escherich read a paper on his experience in treating hereditary syphilis in infants with this drug. The dose at first employed was, at Professor Ehrlich's suggestion, fixed at 0·005 gramme per kilo. of body-weight, in order to avoid suddenly destroying the very large number of spirochætes present in congenital cases of syphilis. Experience soon showed that a dose of 0·01 gramme per kilo. of body-weight could safely be administered. In all cases the injection was made into the gluteal region and was well borne. In the earlier cases a solution in methyl alcohol was employed; somewhat later, Michael's emulsion was used, but latterly the drug had been suspended in olive oil. Local pain and

infiltrations occurred more commonly when Michael's method was made use of. As regards the question of cure, the results were somewhat disappointing. In one case, examined three months after the injection, the Wassermann reaction was still positive, as also in another case, which had received three injections; while in two other cases mild relapses occurred. A single injection failed to produce a complete cure in any one of the six cases treated.

C. E. P.

The Medical Services of the Lines of Communication in the French Army.—The following notes have been taken from a paper by Stabsarzt Adam in the *Deutsch. Milit. Zeitschr.* of February 5th, 1910:—

Each army in the field has its own line of communications under the command of the "Directeur des étapes et des services," who has the rank of a General Officer.

The medical work at the front, as well as on the lines of communication of the army, is under the control of the Director of Medical Services (chef supérieur du service de santé de l'armée), who is subordinate to the General Commanding-in-Chief of the Army, and also to the General Officer Commanding Lines of Communication.

The duties laid down for the General Officer Commanding Lines of Communication are:—

(1) To furnish supplies to the Army.

(2) The evacuation of sick and wounded.

(3) The maintenance of order in Lines of Communication.

The General Officer Commanding Lines of Communication has eight staff officers under him in charge of the technical departments.

(i.) *The Ordnance Department.*—This section takes over arms belonging to killed or wounded.

(ii.) *Engineer Services.*—They have to assist in the preparation of hospitals, accommodation for sick and wounded and the storage of medical material.

(v.) *Medical Service.*—The Medical Service of the Lines of Communication is also under the Director of Medical Services of the Army, who keeps the General Officer Commanding Lines of Communication informed as to the state of health of the Army so that the measures taken at the front may be co-ordinated with those on the Lines of Communication.

There is a Deputy Director of Medical Services in charge of the medical arrangements of Lines of Communication. His duties are:—

To carry out sanitary measures.

To clear and send on any medical units which may have become immobilised.

To arrange for fitting up hospitals; to supervise the working of the clearing hospitals.

To regulate the working of evacuation transport.

The following medical units belong to the Lines of Communication:—

(1) Field ambulances which have become immobilised.

(2) Auxiliary hospitals furnished by the Voluntary Aid Societies; these are primarily intended for the home territory, but may be used on Lines of Communication.

(3) Auxiliary field hospitals furnished by Voluntary Aid Societies are

intended to relieve field ambulances which have become immobilised, but they may be used at the more important points on Lines of Communication. They are managed by the Voluntary Aid Society's Delegate on Lines of Communication and are located by the General Officer Commanding Lines of Communication on the recommendation of the Director of Medical Services.

(4) Civil hospitals which may be taken over by the General Officer Commanding Lines of Communication and used for the troops.

(5) Special hospitals for infectious cases, they fly a yellow flag and are located off the main road. The hospital may have been in existence as a civil institution, or may be fitted out by a Voluntary Aid Society, or in exceptional cases a field medical unit may be taken for this duty.

(6) Evacuation hospitals may be split up by the Deputy Director of Medical Services. Attached to these is the *personnel* and *matériel* for improvised ambulance trains and sick transport columns by road. Voluntary Aid Societies are not permitted to work in these units. Requisitions for fresh *personnel* or *matériel* are sent to the Director of Medical Services; *personnel* to make good casualties is taken from the reserve medical *personnel* of Lines of Communication. An evacuation hospital must have the following divisions: (1) Reception room for sick, (2) wards for those requiring hospital treatment, (3) isolation wards for infectious cases.

(7) Railway Rest Stations (*Infirmeries de gare*) provided by Voluntary Aid Societies at such stations as the D.M.S. may direct; in medical matters they are subordinate to the D.M.S.; for discipline they are under the command of the Station Commandant.

(8) Improvised hospitals (*Infirmeries de gîtes d'étapes*) at halting places on roads.

(9) Convoys—by rail in hospital trains and improvised ambulance trains.

(10) *Depôts de convalescents* (for convalescent patients).

(11) *Depôts d'éclopés* (for trivial sickness).

(vi.) *Service de la prévoté* (*Gendarmerie*).—This branch carries out any sanitary measures ordered by the Commandant, the removal of corpses, and reports the presence of epidemic disease, or cattle diseases.

(*a*) *Railways.*—The "*gare régulatrice*" is situated at or near railhead and is the most important link between the army and the home territory. The senior medical officer in charge of sick convoys communicates with its post commandant and railway station commandant in regard to the organisation of collecting stations for sick, railway rest stations, &c.

(*b*) *Supply Railway Station.*—When the rail reaches up to the supply columns of the army a "*gare d'évacuation*" is organised and sick and wounded are loaded into trains at this point.

After a successful battle a commandant of the battlefield, assisted by a senior medical officer, is appointed to organise the search for wounded, to procure medical supplies, to superintend the removal of wounded, and superintend generally the work of the medical units. C. E. P.

Army Medical Report of the German Army for the Year October 1st, 1908, to September 30th, 1909.

Average annual strength	549,045
Remaining under treatment on October 1st, 1908	7,030

Admitted during the Year:—	
To military hospitals	110,970
To barrack hospital treatment	192,191
To military and barrack hospital treatment	23,721
Total admissions for treatment	326,882
Ratio per 1,000 of strength	595·4
Discharged Hospital:—	
To duty	307,219
Died (= 1·2 per 1,000 strength)	682
Unfit for service	3,658
Discharged as unfit on account of disability acquired prior to enlistment	4,056
Otherwise, *e.g.*, half invalids	11,008
	326,623

Compared to the previous year the admission ratio has increased by 6·9 per 1,000. The principal increases were in the groups digestive organs, skin and connective tissue and mechanical injuries.

The admission ratio for venereal diseases, 19·2, showed an increase of 0·4. Diseases of the nervous system, 5·7, are stationary. Infectious diseases, 26·3, have decreased by 1·6.

Deaths in Hospital.—Among the 326,882 men who came under military medical treatment 682 died = 2 per 1,000. Of all deaths, 606 were due to disease, 52 to accidents and 24 were suicides.

Died out of Hospital.—

	1908-09
By disease	25
,, accident	77
,, suicide	192

The total number of deaths from all causes in the army, both in and out of hospital, was 976. Of this number 216 were suicides — 22 per cent. The death-rate from suicide was equal to 0·39 per 1,000 of strength; this is lower than the preceding year by 0·03.

The actual number of deaths from the principal diseases were as follows: Tubercle, 101; typhoid, 26; epidemic cerebro-spinal meningitis, 11; pneumonia, 117; heart disease, 12.

The actual number invalided from the active army was 22,324 = 40·7 per 1,000 of strength. C. E. P.

Smoking as a Preventative of Cerebro-spinal Meningitis.—Médecin-Major Dr. Kermabon, of the 41st Regiment, publishes an interesting observation in the *France Militaire* of March 8th, 1910. He found that 95 per cent. of the men in his regiment were smokers. During the last three years, forty-three cases of cerebro-spinal meningitis occurred in his regiment; of these twenty-four, or rather more than 56 per cent., were smokers, while nineteen, or a little less than 44 per cent., were non-smokers. Nine cases were fatal, of these four had never smoked, four smoked only on rare occasions, and one was a regular smoker. C. E. P.

The Water Supply of Budapest.—B. Vas (*Archiv. f. Hyg.*, lxxii., 3, 1910, p. 211) gives an account of the bacteriological examination of the water supply of Budapest. Artificial filtration was discontinued in 1899. Since that year reliance has been placed on natural filtration. The supply is furnished by seventy three wells. Water of great bacteriological purity is obtained from them. The monthly average number of bacteria

per cubic centimetre is usually under 50. Before the year 1900 the figures were frequently over 1,000 and seldom below 200. C. B.

The Significance of the Presence of the B. coli communis in Drinking Water.—W. Fromme has contributed a paper, of great importance to bacteriologists, to the *Zeitschrift f. Hyg. u. Infektionskrankheiten*, April, 1910, lxv., 2, pp. 251-304. It embodies a review of the literature of the question of the presence of *Bacillus coli communis* in water. He gives a bibliography of 136 references, and his paper contains an account of much experimental work of his own. Fromme has used for the purpose of growing the *B. coli communis* :—

(1) 1 per cent. dextrose broth.
(2) 5 per cent. lactose broth.
(3) 1 per cent. lactose bile.
(4) 3 per cent. hay infusion.
(5) 1 per cent. phenol broth.
(6) Bulir's neutral red mannite broth.
(7) Loeffler's paratyphoid broth, which contains nutrose and malachite green and lactose.
(8) Harrisons and Leck's æsculin, bile salt broth.
(9) Harrison and Leck's æsculin broth without the bile salt.
(10) MacConkey's bile salt glucose broth.

The best results were attained with the 1 per cent. dextrose broth phenol broth came next; Loeffler's fluid was almost as good; then Bulir's broth; æsculin bile salt broth; lactose bile; 5 per cent. lactose broth; MacConkey's medium, hay infusion and æsculin broth, followed in descending order of efficiency. Fromme compared the increase of growth when the tubes were incubated at 37° and 46° C. Eijkman had advocated incubation at the latter temperature in 1904. The rapidity of growth up to five hours was usually rather greater at 46° C. But later that temperature exerted an inhibitory effect. Fromme considers that Eijkman's method is not of great value for the detection of the *B. coli communis*, though he admits incubation at 46° C. sometimes succeeds when that at 37° fails. He shows that T. Smith's "presumptive test" is not reliable. The test consists in noting the production of gas in dextrose broth. There are other organisms besides the *B. coli* which can ferment this sugar. They are present in water more frequently in the summer than in winter. The *B. coli communis* is a constant inhabitant of the intestinal canals of warm-blooded animals. Among cold-blooded animals the lower we descend the scale the less frequently is this micro-organism found in the alimentary tract. Fromme took cultures found the surface of door-handles, chairs, floors, &c., and detected the *B. coli* in only eight out of ninety-three samples inoculated. He concludes that this bacillus is not so widespread as is often supposed. He is therefore in agreement with most recent observers who regard the presence of *B. coli* in a water as a sign of contamination with dejecta. His methods of examination is as follows: 10 cc. of the water are taken, if pollution be expected, 1 cc., or decimals of a cubic centimetre. The quantities are added to dextrose broth tubes so that the mixtures shall contain 1 per cent. dextrose. Should the water be pure, then a 10 per cent. dextrose peptone solution is mixed with 200 cc. of the water till the proportion is reached. Durham's tubes are used to observe the production of gas. Endo plates are inocu-

lated after the cultures have incubated for twenty-four hours at 37° C. He advises that Endo's agar should not contain too little fuchsin. He employs a freshly prepared solution, 15 grammes of fuchsin in 100 cc. of 96 per cent. alcohol, 10 cc. of this are added to a litre of agar. Reduction is affected by means of 25 cc. of a 10 per cent. freshly prepared sodium sulphite watery solution. If a characteristic growth be observed, agar tubes are inoculated and the culture is further identified by its behaviour in gelatine, its power of fermenting dextrose, of clotting milk, of reducing neutral red, and its appearance on Drigalski-Conradi's medium.

Fromme's conclusions are:—

(1) The most suitable method of detecting the *B. coli communis* in water is that of employing 1 per cent. dextrose broth.

(2) Eijkman's procedure is unsatisfactory. A temperature of 46° C. restrains the development of the *B. coli communis*.

(3) The *B. coli communis* is not ubiquitous.

(4) The detection of the *B. coli communis* in drinking water is a valuable indication of contamination.

(5) An estimation of the number of *B. coli communis* should always be made in a bacteriological examination of water.

(6) The presence of *B. coli communis* is often the first sign of pollution.

(7) The *B. coli communis* estimation is an index of the degree of purity attained by the filtration of river and surface waters.

C. B.

Correspondence.

CLEARING HOSPITALS AND THE TERRITORIAL FORCE.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—Those intimately associated with the Territorial Medical Service and who have considered the difficulties encountered in evacuation of the sick and wounded from the zone of active operations must cordially agree with the remarks made by Major Freeman in the paper he contributed to the December number of the Journal on the above subject. All writers emphasise the dominant part the Clearing Hospital plays in this work, and make it evident that at no point in the line of medical assistance is a high state of efficiency and discipline a more vital necessity. I venture to say that the work of a Clearing Hospital cannot be successfully done by any body which is not essentially military in its organisation, administration, and training. To ensure the successful working of Territorial Clearing Hospitals on mobilisation, it is, I believe, essential that for each of them a strong nucleus be maintained and trained in peace. The suggestion that the water-duty detachments should be drawn on for this purpose appears excellent, and the proposal to train the *personnel* by attaching it to a Field Ambulance alternately with training in a large military hospital, is probably the best that can be put forward.

In the West Lancashire Division we are fortunate in having obtained nearly the full number of men required for water duty, but there is good reason to believe that less difficulty would have been encountered in obtaining recruits had it been possible to offer service in a Clearing Hospital, rather than in water-duty detachments.

I am, &c.,

Wallasey,
December 5th, 1910.

J. H. P. GRAHAM,
Captain, R.A.M.C. (S.R.).

A SIMPLE METHOD OF PRESERVING RUBBER ARTICLES.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—The following simple means of preserving rubber articles may be of interest to readers of the Journal:—

Ordinary paraffin oil is placed in a flat tin vessel of suitable size, only a small amount of oil is needed (about ½ inch in depth); a tray, perforated with numerous small holes, is fitted into the vessel over the paraffin, and the rubber articles are placed loosely on the top of the tray. The vapour from the oil passes through the holes in the tray, comes in contact with the rubber and keeps it soft and supple. A cover should be fitted on the top to keep out dust, &c.—a clean piece of linen or sheeting will answer the purpose well.

This method has been tried in North China with complete success, where, owing to the climatic conditions, rubber goods have been found to deteriorate rapidly and perish.

I claim no originality for the above, I first saw it used in the native hospital of the 76th Punjabis, in charge of Captain J. W. H. Babington, I.M.S., from whom I got the idea.

I am, &c.,

Tientsin,
November 24th, 1910.

A. C. FOX,
Major R.A.M.C.



Yours most sincerely
Robert Jackson

VOLUME XVI. FEBRUARY, 1911. No. 2.

Journal
of the
Royal Army Medical Corps.

Original Communications.

ROBERT JACKSON, M.D., INSPECTOR OF HOSPITALS.

BY MAJOR H. A. L. HOWELL.
Royal Army Medical Corps.

MANY army medical officers have attained greater honours but few men have done more to improve the condition of the British soldier and the army surgeon than Robert Jackson. The life of this clever writer, original thinker, and capable administrator was crowded with interest, and is worthy of note by all army medical officers, as it is the story of a man who, a century ago, fought hard for the interests of the medical service.

The subject of our memoir was born at Stone Byres, near the Falls of Clyde, Lanarkshire, in 1750. His family was not in affluent circumstances, his father being only a small farmer; but, though born to no patrimony, his parents endowed him with a healthy constitution and a good and solid education. He received his early education at the "Parish school of Wandell," and afterwards, under a teacher of some reputation, at Crawford in South Lanarkshire.

Jackson says, in his *Return of Services*, that he never was apprenticed, "but learned to compound drugs and let blood, &c.," under Mr. Baillie, a surgeon in the town of Biggar. In 1768 he proceeded to Edinburgh, and attended one course of anatomy under Alexander Munro in 1769, and one course of practice of medicine under Gregory in 1770. His finances then failed, and he says: "I had not the means of paying teachers. I was therefore under the necessity of teaching myself, or remaining untaught. I never

attended an hospital in the United Kingdom; I could not afford to pay the fees."

In 1774 Jackson embarked as a passenger to Jamaica. The master of the vessel had commanded a transport at the siege of Havannah in 1761, and it is said that from him Jackson picked up many hints on the transport of troops and stores; the master also related his experience of the value of cold bathing as a remedial agent in fevers—a treatment which Jackson constantly employed long before the method was advocated by Dr. Currie. At Jamaica he became assistant to a Dr. King, a general practitioner at Savannah-la-Mar, whose practice extended over a radius of eight or ten miles, and included the medical charge of a detachment of the first battalion of the 60th Regiment of Foot. The military work was handed over to Jackson. He remained with Dr. King four years, but on the whole was not happy in Jamaica, and decided to leave the island. This was providential, for two years later Dr. King and his family, together with some 300 others, perished in a tidal wave which swept over Savannah.

At this time Great Britain was engaged in the lamentable war with her American colonies, and, as there was frequent communication between Jamaica and the American ports occupied by our troops, Jackson determined to join the Army in America as a volunteer. He embarked on a ship, but forgot to obtain a certificate of freedom from debt in Jamaica, then required by law to be produced before a passenger could leave the island; the skipper, although at sea, put in and landed Jackson on the eastern extremity of the island, where he was unknown. Jackson remembered that at Lucca, 130 miles away at the other end of the island, a ship was taking in a cargo of rum for America. He therefore proceeded by boat to Kingston and obtained the required embarkation certificate. Being, however, very short of money, he decided to walk to Lucca. During his tramp he was seized with fever, and nearly lost his life, but at last reached his destination, after what was almost certainly a unique journey in Jamaica for an European. He set sail for New York, and landed there in 1778.

The change of climate from the West Indies to New York rendered additional clothing necessary, and the expense of this, added to the cost of his voyage, reduced his finances to a very low ebb. He could look forward to no employment, but, on the voyage, had made the acquaintance of a Jamaican gentleman who had some influence in New York. This friend asked for a commission for Jackson in the New York Volunteers. In the meantime Jackson

was in absolute want, but was too proud to borrow from his acquaintance. He applied unsuccessfully for an appointment as mate at the General Hospital and at the Naval Hospital. At last, putting a shirt into one pocket and a Homer and a Greek Testament into the other, he started on foot from New York to seek his fortune further inland. On the road to Knightsbridge he met a military officer who looked at him very earnestly. Thinking that he was suspected of going into the enemy's country his conscience smote him and he turned back towards New York.

The first battalion of the 71st Regiment (Fraser's Highlanders) was then encamped at MacGowan's Pass, 7 miles from New York. Lieutenant-Colonel (afterwards Sir Archibald) Campbell was in command. To his tent our adventurer directed his steps and offered himself as a gentleman volunteer to the regiment. The colonel taking a fancy to his brother Scot, accepted him as a volunteer, and Jackson joined the 71st next morning. Colonel Campbell, on learning Jackson's profession, appointed him acting-surgeon's mate, under the Surgeon, Dr. Stewart. [A surgeon's mate was not at this date a commissioned officer, but held a warrant and was not entitled to half-pay. Jackson, however, was later gazetted ensign, and for many years after the war drew the half-pay of an ensign.]

Jackson often said in after years, that reclining the same night on his bundle of straw in his tent after a good dinner, of which salt pork was the whole bill of fare, he felt as if he had attained Paradise. Only a week later he received notification that a commission in the New York Volunteers had been granted him, but Jackson had taken such a fancy to his new regimental home that he declined the appointment.

While the regiment lay at MacGowan's Pass there were few sick, but after its removal to Knightsbridge the number of sick increased rapidly. Jackson now took over the regimental hospital, while the other surgeon's mate took charge of the camp. At this period a regimental hospital was merely a collection of sick men. Each sick man brought his own blanket to hospital with him; there was no properly-arranged dietary for the sick, no classification of cases, and there were no hospital comforts. In short, the patient merely drew the ordinary ration of salt beef or pork and a tot of rum. At Knightsbridge the hospital was a turf hut. Jackson brought about a great improvement. He arranged to draw the money value of the rations for the sick and bought fresh meat instead of salt. He found that he could thus purchase

in the open market proper diets for his patients without extra expense to the Government. This principle he developed on a larger scale in after years.

Jackson accompanied the 71st in its various movements, and was in the advanced redoubt at York Town in Virginia when the Royal Welsh Fusiliers three times repulsed the attempts of a superior French force to carry it by storm. Here began the friendship with Sir Harry Calvert, then a subaltern in the regiment, which afterwards stood him in good stead. General Sir Thomas Saumarez, many years later, placed it on record that Jackson was very ill at this time, but refused to be sent to a place of greater safety.

Jackson was also at the action at Cowpens where the British were outnumbered and in an unfavourable position. Colonel Tarleton, the commander, had his horse killed under him, and would have been captured had not Jackson, who was well mounted, ridden forward and given up his horse to him. Jackson now saw that his own capture by the Americans was inevitable and, seeing that the British wounded had already been taken prisoners, he tied his white handkerchief to a stick and walked towards the enemy's lines. Being asked what he wanted, he answered, "I am assistant-surgeon to the 71st Regiment; many of the men are wounded and in your hands; I therefore come to offer my services to attend them." The enemy looked upon him with suspicion and sent him to the rear a prisoner. He spent the night attending to the wounded, and in default of dressings took off his only shirt and tore it into bandages for them. This action was very characteristic of the man, ever ready to sacrifice himself for the good of others. Next day he was sent for and examined by Colonel Washington. Jackson then offered to attend the American wounded, and this was gratefully accepted. The Americans were so struck with his magnanimity that as soon as an exchange of prisoners was offered they sent back Jackson without requiring an exchange for him, and without asking for his parole.

Dr. Barnes, who wrote one of the memoirs of Jackson, also relates another anecdote of Jackson which belongs to this period. The troops under Lord Cornwallis were falling back, and a building in which the wounded had been placed was riddled by the shot of the enemy. The duty of visiting the wounded was so dangerous that the surgeons decided to cast lots to determine which of them should go. But Jackson, when the proposal was made, said, "No, no, I will go and attend them." And he did so. At

the fall of York Town he again became a prisoner to the Americans and French. As soon as the sick were disposed of he was at liberty to return to England on parole, so he set out on foot in the depth of winter and walked to New York.

Jackson returned to England in the summer of 1782, and, landing at the Cove of Cork, travelled to Dublin, and thence to Greenock and Edinburgh. After a short stay he walked to London in twelve days, and during his march experimented on his dietary to test his theory that foot travellers should only eat meat at the end of the day. He found that he marched best on a diet of tea and bread, with a light meal for supper. A fuller regimen with beef and porter at 3 p.m. enabled him to walk more briskly for two hours after the meal, but he ended the day more tired and was less willing to rise next day.

When the Peace of Amiens opened the Continent to British travellers, Jackson told his friends "he was going to take a walk," and started on what proved to be the tour of Europe on foot. His funds were very low for such an enterprise, apparently his sole fixed income being his half-pay as an ensign in the 71st, which he continued to draw until appointed surgeon to the Buffs in 1793. Behold our hero then with very little store of money, a small bundle of necessaries, a map of Europe, without a single recommendation to anyone abroad, starting forth on the "grand tour"! He landed at Calais, where he was immensely struck by the appearance of a regiment of Swiss Foot, which he thought the finest infantry regiment he had ever seen. Thence he went to Paris, and on to Switzerland by easy stages, reaching Geneva in August. He then pushed for the German frontier by way of Berne to the Rhine, and through Suabia and Bavaria to Ulm on the Danube. As he journeyed he noted down the national characteristics of the people. In Suabia he noted the women have very fine limbs and very short petticoats, "but limbs are almost the only beauty the women of Suabia have to boast of." Having no passport, he was arrested as a vagabond at Gunzburg, in Austria, and told he would have to be detained in the barracks unless he volunteered to serve in either the Horse or Foot, as the Emperor was about to declare war on the Turk. He refused, and was at last allowed to go free. He set out for Venice by way of the Tyrol. From Venice he went to Padua, Mantua, and Cremona, and through Lombardy to Geneva. Onward through Nice he entered Provence, nearly losing his life when wading the Var in order to save the exorbitant charge asked for a passage by boat. After visiting Toulon, Marseilles, Aix, and

Montpelier, he at last reached Bordeaux, with his resources reduced to the sum of six sous. In this extremity he appealed for assistance to an English merchant, who at once advanced him a few pounds. He then made his way by Rochfort, Rochelle, and Nantes to St. Malo, where he embarked for Guernsey and Southampton.

During his ramble of seven months' duration Jackson had tramped 5,000 miles, and afterwards expressed the opinion that he had acquired more knowledge by his observations and reflections during his journey than he could have obtained in as many years in the haunts of learning from the most erudite of professors. His account of his tour is illuminated by many descriptive touches which show us that he was a man of some humour. At Rochfort, where he lodged with two Jesuits at an inn, he discussed religion with them, and they charitably assured him that he must inevitably be damned unless he turned Catholic. Just before reaching Genoa, he says, "In a neat little village at the bottom of the mountain I went to breakfast at a coffee-house. It was kept by a young woman of a good countenance and handsome figure. She showed me some of her work, and wanted me to buy an embroidered handkerchief. Though my money was diminishing apace, I don't know if I could have resisted the importunity of so fine a woman, had not the arrival of some travellers in the meantime called her away to prepare some coffee. One of the travellers was a French merchant, and was so struck with her beauty that he declared himself her slave, and the embroidery he said was charming. The girl was pleased and carried him upstairs to look at something in the frame yet finer than that. I paid for my coffee and proceeded on my road."

He summed up the appearance of the people at each place in a few words. At Mantua the men were stout, the women better looking and remarkably well limbed. At Montpelier he found the ladies fair, elegant and amiable. Jackson's pedestrian tour reminds us of that of Oliver Goldsmith. Both were medical men, but Goldsmith carried a flute with which he propitiated hospitality. In both instances the observations made found fruit in after-literary efforts. Goldsmith gave his in verse, while Jackson's estimates of national character were embodied in his pyschological study of the soldiers of different nations, which forms a very readable part of his book on the "Organisation of Armies."

Jackson landed at Southampton with only four shillings in his pocket, and his way-worn appearance quickly attracted the attention of the people. He was clad in what had once been a black coat,

now faded to brown and somewhat threadbare, and wore a shovel hat, so that he was readily mistaken for a Methodist preacher, and the populace, thinking him one, were lavish with their jests at his appearance as he passed on his way.

He set out to walk to London. At Winchester and other places he was refused a bed, and wrote in his notes, "On Sunday morning I was 64 miles from London, and had only one shilling in my pocket. I was hungry, but durst not eat—thirsty, and I durst not drink, for fear of being obliged to lie all night at the side of a hedge on a cold night in December." At last he reached London, fatigued, hungry, and penniless. Here he learnt that his regiment, the 1st Battalion of the 71st Foot, had returned from America and had been sent to Perth to be disbanded. Although it was January (1784) and snow on the ground, he started on foot to rejoin his regiment, reaching Perth three weeks later. At Perth he took up the study of Gaelic. The 71st was disbanded in 1783, and Jackson, after a pedestrian tour of the Highlands, made his way to Edinburgh, where he stayed two or three months. He had formed an attachment to the daughter of Dr. Stephenson, of Edinburgh, an accomplished lady of good fortune, who was also the niece of Colonel Shelley, one of Jackson's friends in America. They were married in 1784. Jackson's marriage placed him in easy circumstances and enabled him to go to Paris to pursue the study of medicine. He attended chiefly the practice of the Hôpital de la Charité, which he considered the best hospital he had seen. Remaining in Paris till the end of the year, he not only added to his medical knowledge but took up the study of Arabic. He then went to Brussels and Leyden. At Leyden, in 1785, he took the degree of Doctor of Medicine by examination. Returning to England, he went into private practice as a physician at Stockton-on-Tees, where his wife's uncle resided. Although private practice was not congenial to him, he was highly esteemed and successful as a practitioner.

Jackson had resolved early in life never to read translated works, but to study the originals. In the pursuit of this idea he became an accomplished scholar and linguist. A good classical scholar, he was also proficient in French, German, Spanish and Italian, and had some knowledge of Gaelic, Arabic, and Persian. In 1791 he published the result of his experience in Jamaica and America. The book is entitled "A Treatise on the Fevers of Jamaica, with Observations on the Intermittent Fever of America; and an Appendix containing some Hints on the Means of Preserving the Health of Soldiers in Hot Climates." This book was reprinted at

Philadelphia in 1795, and was published in German at Liepzig in 1796.

On the outbreak of the war with France in 1793 Jackson wrote to the Secretary at War offering to re-enter the Army as a physician to the forces for service in the West Indies. John Hunter, then "Surgeon-General and Inspector of Regimental Hospitals," had made it a rule that no person could hold the rank of Army physician who was not (or had not been) staff-surgeon, regimental surgeon, or apothecary to the forces. Hunter, to whom Jackson's application for service had been referred, therefore refused to accept the offer, stating his reasons. In reply Jackson offered to accept the surgeoncy of a regiment in the West Indies, or under orders to proceed there, on condition that his promotion to physician should follow in due course. He was offered the appointment of surgeon to the Buffs, then under orders for the West Indies, and, having accepted it, was gazetted on October 15th, 1793, in the following terms: "Mr. Robert Jackson, from half-pay of Ensign 71st Foot, to be Surgeon to the Buffs, vice Dryden promoted." The Buffs did not go to the West Indies after all, but, after taking part in an abortive expedition to the French coast, returned to England and were quartered at Lymington. John Hunter died on October 16th, 1793, and the Medical Department was then remodelled under the direction of a Medical Board consisting of a Physician-General, a Surgeon-General, and an Inspector of Regimental Hospitals. The gentlemen selected to fill these posts were not of any great eminence in their profession, and they were all practically unacquainted with military service. The Medical Board upset much that Hunter had done and brought in a new regulation by which the appointment of physician in the Army was restricted to a favoured class—namely, the graduates of Oxford or Cambridge, Members of the College of Physicians of London, or, failing these, Licentiates of the last-named body. Jackson, finding himself barred by the new rule from all prospect of becoming a Physician to the Forces, went to London and had an interview with Sir Lucas Pepys, the Physician-General, to whom he mentioned John Hunter's promise, and drew attention to his experiences as an Army physician as well as to the fact that he had written a book on the fevers of Jamaica. Sir Lucas appears to have lost his temper, and replied, "Had you the knowledge of Sydenham or of Radcliffe, you are the surgeon of a regiment, and the surgeon of a regiment can never be allowed to be a physician to His Majesty's Army." Jackson retorted that the regulation was made in ignor-

ance and could not fail to be injurious to the service. Seeing that there was no appeal against the decision, Jackson asked for an interview with the Commander-in-Chief, intending to resign his commission as surgeon to the Buffs; but, being informed that the regiment was about to be sent to Jersey, where an attack by the enemy was expected, he withheld his resignation and accompanied his regiment.

In August, 1794, the regiment was ordered to Flanders to join the army under H.R.H. the Duke of York. A few days later the Duke reviewed the regiment, and was accompanied by Major (afterwards Sir Harry) Calvert, who had been a subaltern with Jackson in America. Major Calvert recognised his old friend, and stopped to speak to him, while the Duke rode on. On rejoining the Duke, Major Calvert apologised for his delay, stating that he had met an old friend, and gave a short account of Jackson's merits and services. To this apparently trivial incident Jackson attributed his later good fortune, for the Duke of York, who afterwards became Commander-in-Chief, honoured Jackson with his protection. At the end of 1794 the Duke left the Army, and Lieutenant-General Harcourt took over the command. The troops were in retreat through Holland. It was terribly cold, the population was unsympathetic towards our troops, the soldiers fell sick in thousands, the accumulation in the numerous hospitals, which had been established was very great, and the mortality enormous. Under these circumstances General Harcourt recommended Jackson for promotion to Physician to the Forces, and the Commander-in-Chief approving the appointment, Jackson was promoted in spite of the regulation of the Medical Board. Jackson, however, promised to obtain the licence of the London College of Physicians on his return to England. Jackson's appointment was the first step towards breaking down the monopoly of the College and throwing open the higher ranks of the Medical Department to the regimental surgeon.

Jackson joined the hospital at Bremen as physician. The British had been driven out of Holland after a disastrous campaign, and it was decided to send the infantry to England, but to retain the cavalry (about 5,000 men) to join the Austrians. Jackson was given the option of remaining with the cavalry as head of the Medical Department. He had also to make the arrangements and superintend the embarkation of 500 sick and convalescents of the infantry. These were, after some delay, embarked at Bremen Lake, and Jackson returned to Bremen, where a general

hospital for the cavalry had been established. Dr. Kennedy (Inspector-General of Hospitals on the Continent) died about this time, and Jackson, in face of the remonstrances of the Medical Board, was appointed his successor. It thus became necessary for him to communicate with his medical chiefs at home, and he accordingly wrote repeatedly to them on matters of hospital management, but received no reply to his letters. Soon afterwards he was ordered to England.

Two armies were now being organised for service in the West Indies. Sir Ralph Abercrombie, with 15,000 men, was to undertake the conquest of the French Caribbean islands, and another army was assembling in Ireland to go to St. Domingo. Jackson asked to be included in the staff of the proposed expeditions, and when he reported himself at the Horse Guards he was ordered to join Sir Ralph Abercrombie at Southampton. In the meantime Jackson had learnt that Mr. Rush had been offered the medical direction of the expedition on special terms, but had declined. When ordered to carry out the medical arrangements for the expedition, Jackson asked if the terms of service offered to Mr. Rush were available for others. Sir Ralph replied that he believed not, and Jackson therefore refused the appointment, as he considered it would be derogatory for him to accept lesser terms than those offered to another; although it was pointed out to him that special terms had been offered Mr. Rush because he would have had to give up a lucrative practice to go on the expedition. Sir Ralph Abercrombie was greatly annoyed at Jackson's refusal. Jackson, however, offered to go in an inferior capacity as Physician to the Forces. Mr. Young was gazetted Inspector-General of Hospitals for the Caribbean expedition, and Jackson was asked to go with the St. Domingo force as second to Mr. Weir. Jackson accepted, and joined the force at the Cove of Cork in October, 1795. He arrived at St. Domingo in May, 1796, and was sent to inspect the different stations in the island occupied by British troops. Jackson was now engaged in most congenial work—namely, the study of epidemic disease. It was his custom to take down his notes of disease at the bedside. In addition he soon found himself engaged in drawing up a scheme for the removal of the abuses connected with the system, by which (at that time) the Colonels of regiments serving in the colonies, or their representatives, acted as contractors for the subsistence of the sick in hospital. Jackson arranged that the value of the man's rations should be credited to him, and through the commissary expended in accordance with

his needs, a fixed rate of values for the different commodities being laid down. The result was increased comfort for the sick, and a saving of not less than £80,000 a year.

In 1798 Port-au-Prince was evacuated by the British troops, and Jackson and his friend, Dr. Borland, being free, decided to visit the United States. In the United States they were well received by Dr. Benjamin Rush and other American physicians, and Jackson was pleased to find that his first book on fever was regarded as a standard work and was in the hands of every respectable practitioner. He also met General Morgan, to whom he had been a prisoner during the American War.

Jackson returned to England in 1798, and rejoined his family at Stockton-on-Tees. The same year saw the publication of "An Outline of the History and Cure of Fever, Contagious and Epidemic, more especially the Contagious Fever of Ships, Jails, and Hospitals, vulgarly called the Yellow Fever of the West Indies; to which is added an Explanation of Military Discipline and Economy; with a Scheme of Medical Arrangement of Armies." This book contained the result of his experience on the Continent of Europe as well as of his researches in St. Domingo.

A body of 1,700 Russian troops which had co-operated with the British troops in the Expedition to the Helder was in 1799 stationed in Jersey and Guernsey and arrived there in a very sickly condition. At the request of the Russian Ambassador Jackson was appointed Inspector of all the Russian hospitals, and his administration of the numerous hospitals on this special service was so successful that in 1800 His Royal Highness the Commander-in-Chief nominated him Physician and Head of the Army Depot Hospital (then at Chatham, and afterwards in the Isle of Wight). This appointment led eventually to more trouble with the Army Medical Board. Jackson's reforming zeal led him to reorganise the dieting of the hospital on the lines he had found so successful elsewhere. His alterations were known to the Medical Board, and Mr. Keate, one of the members of the Board, at his inspection of Chatham in June, approved of them. The Medical Board, however, soon had the opportunity, as Jackson believed, of damaging his reputation. An epidemic broke out at Parkhurst, leading to a great increase in the sick-rate and mortality. The Medical Board, taking advantage of this outbreak and overlooking Jackson's economy and administrative ability, made representations or, as Dr. Jackson put it, preferred charges against his management in the hopes of removing him from the service as one who was disposed to innovate. The

Commander-in-Chief therefore ordered an investigation by a Board of Medical Officers. As a result of their report the decision of the Commander-in-Chief was forwarded to the General Officer Commanding on January 1st, 1802. An extract ran "His Royal Highness conceives the unanimous opinion of the Board to have exculpated Dr. Jackson from all improper practice in the treatment of diseases, and in the care of the sick, and is gratified in seeing that an opportunity has thus been given to that zealous officer of proving his fitness for the important situation in which he is placed." His Royal Highness also expressed his opinion that the Physician-General and Surgeon-General "were not grounded in their representations regarding the hospitals in the Isle of Wight; and that instead of having recourse to inferior officers, who had served under Dr. Jackson, for their opinion as to his practice and mode of treating the sick, it was their duty to satisfy themselves on these points from their own personal observation."

Jackson did not consider that this went far enough. Either the charges were true or false. He considered that an attempt had been made to ruin his reputation, and that the framers of the charges deserved punishment. As his retention of his appointment would necessitate official correspondence with the Medical Board, and he did not consider it possible for him to hold intercourse of any kind with the Surgeon-General, who had, in his opinion, acted so invidiously, Dr. Jackson asked leave to resign. His resignation was accepted regretfully by the Commander-in-Chief, who expressed his favourable opinion of Jackson's "zealous exertion in the execution of his duty, and set a just estimation on the merits of his former services."

Jackson, on his retirement, returned to the practice of his profession at Stockton-on-Tees. A report having been circulated that he had been removed compulsorily from the Service as unfit to perform the duty of a physician, and, considering that such a report could not fail to make an impression in the Army, in 1803 Jackson published a book entitled "Remarks on the Constitution of the Medical Department of the British Army, with a detail of Hospital Management, and an Appendix Attempting to Explain the Action of Causes Producing Fever, and the Operation of Remedies effecting a Cure," in which he publicly contradicted the statement. This book was followed, in 1805, by another with the title "A System of Arrangement and Discipline for the Medical Department of Armies." In 1804 had appeared the first edition of Jackson's greatest work, "A Systematic View of the

Formation, Discipline, and Economy of Armies." The *Edinburgh Review* having severely criticised one of his books, Jackson wrote a letter to the editor. The review was certainly an unfair one, but it does not appear that the editor took any notice of Jackson's letter. He therefore published it in 1804.

In 1807 Major-General Simcoe was nominated Commander-in-Chief of the Forces in India. He had formerly commanded the forces in St. Domingo, and was therefore well acquainted with Jackson. He now wrote to Jackson and offered him the appointment of military secretary on his staff. This rare, if not solitary, instance of a medical man being selected for such an appointment shows how Jackson's sterling qualities were appreciated in the Army. Jackson was highly gratified, and gratefully accepted the appointment. Unfortunately, General Simcoe died before leaving England to take up his appointment, and Jackson lost a valuable appointment and remained in private practice at Stockton-on-Tees. His heart was, however, with the Army, and he wrote several times to Mr. Pitt pointing out the administrative and financial abuses which existed in the Medical Department. Pitt did not acknowledge the letters, and Jackson therefore, between 1803 and 1809, considered it a public duty to publish several works on the system, arrangement, and discipline of the Army Medical Service. His publications were certainly not of a character to make him a *persona grata* to the members of the Medical Board which controlled the Department. For instance, in one of them (Remarks, &c.) he endeavoured to show that " two-thirds of the medical officers of the hospital staff were not adequately employed, and that two-thirds, or more than two-thirds, of the medicines ordered for the use of the forces destined to act in foreign parts decayed and perished in store before there was an opportunity of applying them to a purpose."

On the outbreak of the Peninsular War an army of reserve was formed in England, and to this force Jackson, in 1803, was appointed Inspector of Hospitals. This appointment was made without the Surgeon-General and Physician-General being consulted, and they probably regarded it as in some measure a censure on themselves. The fifth report of the Commissioners appointed by Parliament to inquire into the conduct and administration of the different military departments appeared in 1808. This report dealt with the Medical Department and suggested certain reforms. The Commissioners had, it appears, read Jackson's books. Mr. Keate, the Surgeon-General, published his " Observa-

tions on the Parliamentary Report," and in an appendix gave his account of Jackson, who considered this was done purposely to injure him, and applied for an investigation before a military court. The Surgeon-General refused, and Jackson, being still on the half-pay list, was debarred from getting redress through a military channel. Jackson thereupon published "A Letter to Mr. Keate." In it he refuted statements published by Mr. Keate, and expressed his surprise "that a man so arraigned should be permitted to hold the office of Surgeon-General till acquitted by public trial." A great controversy ensued, in which Dr. Bancroft, an Army physician, supported the Medical Board, and McGrigor, afterwards Director-General, supported Jackson. Jackson also wrote and published two letters to the Commissioners of Military Inquiry, and one to Sir David Dundas, the Commander-in-Chief, in which he replied to Dr. Bancroft and to Mr. Keate. There was much hard hitting on both sides, and were it not that good for the Department resulted from the inquiry and controversy we should be inclined to regard the whole affair as a very painful episode in the history of the Army Medical Service.

The events in Spain now led Jackson to place his services at the disposal of the Commander-in-Chief, expressing indifference as to the rank in which he served. His offer was referred by the Secretary of State to the Army Medical Board. The Physician-General and Surgeon-General replied that there were various and insurmountable objections to his being employed in the Medical Department of the Army, and when required to state them, they did so at great length. Amongst others was the insinuation that Jackson had no diploma as a Doctor of Medicine. Jackson's Leyden diploma had been lost with his baggage during the campaign in Holland, and he was therefore unable to produce it when asked to do so by the Surgeon-General, although he told him that a copy could be obtained from Leyden. Jackson was now more than ever a man with a grievance. Chancing to meet the Surgeon-General in the street he accosted him, and, giving his reasons for his conduct, chastised him by laying a cane about his shoulders. The result of this *rencontre* was that Jackson appeared before a magistrate on a charge of assault, and, refusing to make any defence, was sentenced to six months' imprisonment in the King's Bench prison.

During his imprisonment he devoted himself to the care of the sick amongst his fellow prisoners. He was frequently visited by Sir Harry Calvert and other military friends, and devoted much time to study and literary composition.

But Jackson was speedily avenged, for the ineptitude of the Medical Board was brought to public notice by the miserable failure of the Walcheren Expedition. In 1810 a Parliamentary inquiry brought out such startling evidence that the Medical Board was dissolved and a Director-General appointed, assisted by three principal inspectors—all with military experience—to direct the affairs of the Army Medical Department.

In 1808 Jackson published at Edinburgh "An Exposition of the Practice of Affusing Cold Water on the Surface of the Body for the Cure of Fever, and of Gestation in the Open Air, in Certain Conditions of Disease."

In 1811 Mr. Weir, the Director-General, asked Jackson if he would care to serve again in the West Indies. He agreed, and Jackson's name was sent in to the Commander-in-Chief, who objected, on the grounds that Jackson was considered insubordinate, and therefore likely to give trouble. The Director-General stated that he had not found Jackson so, and the appointment was therefore made on the condition that the Director-General accepted responsibility. Jackson went out to the West Indies as Inspector of Hospitals for the Windward and Leeward Islands, and spent several years which were fruitful to the Service in the production of many valuable reports on the topography and diseases of every military station in those islands.

He returned to England, and on June 25, 1819, was placed on half-pay as an Inspector of Hospitals. According to the *Gentleman's Magazine*, "Government considered his services in the West Indies had such claim upon them that they, in addition to his half-pay as Inspector-General of Hospitals, for many years allowed him £200 per annum, in consideration of his age and services."

In 1817 Jackson published "A Sketch of the History and Cure of Febrile Diseases, more particularly as they appear in the West Indies among the Soldiers of the British Army." A second edition of this work appeared in 1820, and to it was added a summary of Jackson's official reports on military positions, barracks, and hospitals in the West Indies. Of this edition the *Quarterly Journal of Medical Science* wrote: "The matter indeed of these two volumes offers a most astonishing fund of information on the subject of fever, and no tropical visitor, in particular, should proceed to his destination without possessing the work. The European physician, too, will find that the veteran Jackson has anticipated almost every modern writer on fever in all those

points of pathology and practice in which we excel our forefathers."

Age and experience had not diminished Jackson's interest in yellow fever, and when, in 1819, an epidemic of this disease broke out at Cadiz, the question arose whether or not it is contagious, and as this point had not been definitely decided, Jackson, through the Director-General, made an offer to Government to investigate the subject and to proceed to Cadiz at once. The Secretary of State accepted his offer, but when Jackson got to Gibraltar he found the road to Cadiz closed by an insurrection, and thinking he would like to study the plague, decided to travel to the Levant at his own expense. He went therefore to Malta, and from thence to Constantinople, Smyrna, Athens, and the Ionian Isles. He wrote to a friend *en route* that he had been too late to overtake the plague at Malta or Constantinople, but was in hopes to *catch* the yellow fever at Cadiz. At Patras, in June, he fell ill from heat and overexertion. He returned to Gibraltar in July, and reached Cadiz on August 23rd. An outbreak of yellow fever was reported the very day he arrived, and the epidemic lasted for two months. He then went to Jerez, where the disease also existed in severe form. Jackson was accompanied to both places by Dr. O'Halloran, a medical officer of the Gibraltar garrison, who afterwards wrote an interesting little book on their investigations.

Jackson returned to England; but his zeal for the public service remained undiminished, for we find him in his 77th year offering to waive his rank and do duty in the military hospitals in Portugal with the British force, then acting in that country under the command of General Sir W. H. Clinton.

In the same year, on April 6th, 1827, Dr. Jackson died of paralysis at Thursby, near Carlisle.

His second wife, a daughter of the Rev. J. H. Tidy, rector of Redmarshall, and sister of Colonel Tidy, 24th Regiment, survived him. By his first wife he had twin sons, a daughter, and a third son, all of whom died before their father.

Jackson was of middle height, erect and muscular, but slender rather than stout in frame. He was rather florid in complexion, and had blue eyes and brown hair. His forehead was finely developed and intellectual, his nose of Grecian type, but the benign expression of the upper part of his face was somewhat modified by the firmness of his lower jaw. It is the face of one not given to quarrels, but at the same time it is the face of a fighter. Neat and plain in his dress, usually of brown or blue material, his general

appearance was of the Quaker type. He always carried a gold-mounted cane with a silk tassel attached to it.

Modest and mild as a rule, he was very determined when roused by what he considered to be an insult. Humane to a degree, his liberality is said to have trenched greatly on his means. One who knew him well, General Sir John Grey, said of Jackson that he exhibited more of the character of a true Christian than any man he had ever met. Jackson was temperate in diet and a water drinker as a rule, but he at times took light wines and champagne. He abhorred the "filthy habit of smoking," and regretted that so many of our soldiers had contracted the habit when abroad. He thought indulgence in tobacco distinctly injurious to health, and that it tended to provoke thirst and alcoholic excess. He numbered amongst his friends most of the leading generals and military officers of his day, including Sir John Moore and Sir Ralph Abercrombie.

Jackson published altogether twenty-three pamphlets and books. Most of these have already been referred to. We may add that in 1823 appeared "An Outline of Hints for the Political Organisation and Moral Training of the Human Race," and in 1824 he published the work on which his reputation as a writer will stand the test of time, for it is a military classic. This book, "A View of the Formation, Discipline, and Economy of Armies: with an Appendix containing Hints for Medical Arrangements in Actual War," is an expanded second edition of the book he published in 1804. Long after his death, in 1845, some of his old friends published a third edition of this book, with a memoir of his life and services drawn up from his papers and the communications of his surviving friends. The biography, according to the late Sir Thomas Longmore, was written by Sir Ranald Martin. This edition also contains a portrait of Jackson.

Jackson's works show that he considered the subject of medical establishments one of the greatest importance. "It is," he says, "a confessedly complex subject, for it comprehends a wide range of general and practical knowledge of military service, as well as a correct acquaintance with the history, causes, and consequences of the diseases to which troops are most liable in the field and in quarters." He had reason to deplore in his day that the opinions of medical officers in matters peculiarly belonging to their province were not regarded with the attention to which they were justly entitled. He writes that "In the arrangements for the prevention of sickness the Army doctors have but a feeble voice. They are

rarely allowed to prescribe a rule for obviating the recurrence of disease; their labours are chiefly confined to the treatment of those who are actually sick—that is, to the repair of ineffective parts." He considered that an Army surgeon's duties should not thus be confined, but his energies also directed to the investigation of the causes, the detection of the presence, and the drawing up of plans for obviating the effects of disease.

Jackson continually urged the necessity for an efficient medical staff, and, in 1803, advocated an improvement in the social status and pay of the medical officer in order to bring this about. At the same time no man had a higher opinion of the medical officers of the Army, for he declared that "if ever medicine emerged from its low position, raising its head so as to fix its station among the sciences, it is more than probable that it will owe its good fortune to the medical officers of armies, and more so to the medical officers of the British Army than to others."

Jackson was strongly of opinion that the army medical officer should have a definite military rank, from Lieutenant to General. He pointed out that in order to carry out his duties effectually the medical officer must have authority, and that in the army there can be no authority without definite military rank.

Jackson advocated the appointment of sanitary officers, a suggestion which was not adopted until many a long year after. To quote his own words: "As the health of troops is a matter of the greatest importance to the success of war, health officers may be justly considered to be an important part of an army."

The soldier in the West Indies is indebted to Jackson for the benefit of being stationed in the elevated parts of the islands instead of in the ports. He believed firmly that idleness and overfeeding were the great factors in the production of disease in the tropics. He gives many instances where soldiers who had been worked hard and underfed maintained good health, but suffered greatly from disease when underworked and overfed. Sir John Moore was also of this opinion.

Musketry practice with ball is said to have been first urged by him. His suggestion was that after six months' preliminary training, three days of the soldier's week should be devoted to the practice of firing with ball cartridge, seven rounds to be fired on each occasion.

A Royal Warrant, issued on January 1st, 1806, fixing the rate of hospital stoppage at 10d. a day, originated in Jackson's demonstration that the sum of money which feeds a soldier in barracks

is sufficient to feed him and give him necessary comforts in hospital. The Medical Department occasions, in such case, no expense to the State beyond the salary of the medical officers, medicines, and lodgings. This must have effected an enormous saving to the State.

The scale of medical officers to an army which Jackson considered necessary may be of interest. He laid down as sufficient, a surgeon and assistant-surgeon to each regiment in peace time, with an additional assistant-surgeon on active service or when serving in unhealthy climates. In the field each brigade should have a staff surgeon (as administrative medical officer), and three hospital assistants as extra aid, with power to open hospitals to relieve the regimental infirmaries, which latter should always be able to move at an hour's notice. A division would require in addition a physician and several hospital assistants to establish hospitals for the relief of the brigade and regimental hospitals. All large forces should have also an inspector-general "to correct, superintend, and bring the movements of the whole concern into one view, so as to be easily comprehended by the chief commander."

Jackson considered the medical staff of a division in his day to be excessive, and says it was sufficient for the care of the whole Army if it were in hospital or on the sick list, and pointed out that many officers held nominal positions, or were ineffective from want of experience and proper training. He therefore advocated the establishment of a military medical school at the depot, Isle of Wight.

It would, however, be impossible in the short space of this memoir to indicate the full scope of the abilities of this remarkable man. His books touched on every phase of military life: he discussed the soldier in camp and in quarters, in health and disease; he wrote on military training, clothing, diet, punishment, exercise, barracks, camps, and hospital ships, and was, we believe, the first to point out the importance of the military study of the psychology of nations—the effects of national character on the behaviour of the soldier in the field.

Robert Jackson's worth received but poor recognition in his own lifetime, but, to quote the words of his obituary notice in the *Gentleman's Magazine:* "If superior talent unremittingly devoted, for the greater part of half a century, to relieve the miseries of suffering humanity can entitle a man to the gratitude of his countrymen, no man deserved it more than Dr. Jackson."

A REPORT ON THE DETERMINATION OF THE AMOUNT OF TIN IN TINPLATE USED FOR CANNING PRESERVED FOOD.

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The following investigations were made at the request of the Research Committee—Hygienic Section—Army Medical Advisory Board, to ascertain the proportions of tin in tinplate which should be used so as to obtain a well-tinned and serviceable can suitable for preserved foods.

It is evident that although the thickness of the layer of tin upon iron plate is of some consequence, yet it cannot compare in importance with the regularity and completeness of its distribution. In cases where the tin is unevenly distributed it is apt to fissure in the thinnest parts; moreover, where small holes or cracks break the continuity, galvanic action is set up between the iron and the tin in the presence of moisture and the result is rust, and if the action take place inside the tin metallic contamination of the contents will probably occur. Here it may be remarked that one of the advantages of the present custom of painting the outside of tins for Service use is the prevention of rust arising from this cause, and the utility of the can is thereby considerably enhanced. In the interior of the can the necessity for good tin-plating is still more urgent, as here metallic contamination from erosion of the metal is very apt to occur, especially if the contents of the tin be of an acid nature. Such contents are: fruits, *e.g.*, peaches, pears, pineapples, tomatoes, &c.; soups, like tomato soup, and fish, such as lobster, salmon, herring; also highly-salted foods, meat essences, corned meats, kippers and bloaters. Organic acids, especially tartaric—usually found in fruits—appear to have a special tendency in this direction.

To illustrate the condition likely to arise from an unevenly distributed tin surface, or by reason of numerous pin-holes, two condemned tins were examined containing respectively kippers and peaches. The interior of both was almost completely denuded of tin as shown in figure 1.

As the external surface in both cases showed inequality of tin, and the presence of numerous pin-holes and fissures, presumably the internal surface was originally in the same condition; it was, more-

over, exposed to highly acid contents. The acidity of the kippers reckoned as H_2SO_4 amounted to 0·313 per cent., while that of the peaches was 0·595 per cent. This high acidity was undoubtedly responsible for the more or less complete removal of the tin from a surface which readily lent itself to the absorbing action of the

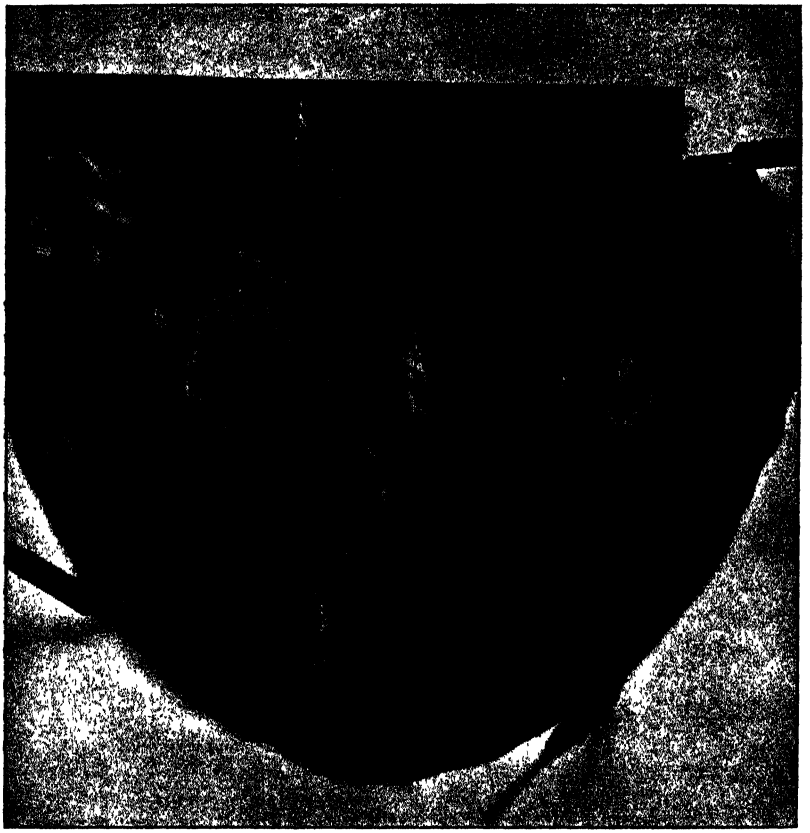


FIG. 1.—Photograph of a piece of the lid of a can, showing marked erosion. The surface was blued with ferricyanide of potassium, and the light areas show amount of tin remaining.

contents. Samples were taken from the lid and side of the peach tin; the former was bright on both sides and probably represented the original tinplate used, while the latter, although bright externally, was almost completely denuded of tin on its inner surface. The amount of tin found per square inch of surface, in the case of the sample from the lid, was 0·0460 grammes, while in the

sample from the side, the amount only reached 0·0218, or barely one-half. In the case of the kippers, it was not possible to obtain a sound portion; on a square of one inch the tin found was only 0·0205 grammes. On analysing a portion of the contents, 21·69 grains of metallic tin per pound were found, which at the same rate would equal 20·2 grains for the whole contents of 425 grammes.

The metals likely to be found in the contents are not only tin, but also iron, and traces of copper, zinc, cobalt, and even in rare cases lead and antimony, derived from the iron plate on which the tin is deposited. In examining the contents for the presence of tin one must bear in mind that this may also be derived from any solder present in the interior of the can.

Professor W. H. Walker, of Massachusetts, in a paper communicated to the *Journal of Industrial and Engineering Chemistry*, vol. 1, No. 5, May, 1909, has described a method for detecting pin-holes in tinplate. Prior to reading this paper, I have been in the habit of using a solution of ferricyanide of potassium for the same purpose, but the method of using this reagent has been perfected by Professor Walker, and it is now one of considerable utility. He states that the "pin-holes are generally so small as to be undetected by the naked eye, and that they are unquestionably greater in number upon a sheet which carries a thin coating of tin than upon a triple or quadruple plate." They naturally impair the life of the can.

When rust-spots form upon the surface of tinplate the iron must dissolve at the bottom of the pin-holes and pass thus dissolved to the surface, where it is oxidised. By means of potassium ferricyanide, a reagent which immediately forms with these iron ions an insoluble precipitate, bright blue in colour, the presence of pin-holes can be demonstrated. The following solution was found to show the majority of pin-holes within thirty minutes:—

Gelatine	50 grammes
Water	50 ,,
Potassium ferricyanide	1 gramme
Sulphuric acid..	0·1 ,,

The gelatine is dissolved in water by the aid of heat, and the ferricyanide is added as the reagent is needed. Owing to the gradual reduction of the ferricyanide, and the action of the acid on the gelatine, the acid should only be added when the gelatine has cooled to 40° C. and only as much of the reagent prepared as can be used within a few hours. Gelatine is added to eliminate disturbances on the surface by convection currents, and the acid

hastens the solvent action of the water by increasing the number of hydrogen ions. The sensitiveness of the reaction may be increased by dipping the plate for two minutes in 5 per cent. H_2SO_4.

As illustrating the delicacy of the process, a piece of plate, No. 8 gauge, purchased from a tinsmith, and apparently a well-plated sample, when treated with the solution showed numerous pin-holes which were invisible to the naked eye. Another piece taken from a biscuit-box showed a very great number of pin-holes and also some fissures.

The interior of certain cans, especially those containing very acid foods, such as jams, fruits, &c., sometimes presents a crystalline appearance. This is due to corrosion of the tin by acid, with subsequent crystallisation on cooling. The acid in the contents makes the crystallisation more apparent. The same result can be obtained by pouring a mineral acid, such as hydrochloric acid, over the plate. This crystalline appearance takes the form of large regular hexagons, or fern and leaf-like forms (*moiré metallique*). The prolonged action of melted palmitic acid can also produce this effect.—(Manual of Chemical Technology, Wagner, p. 201, 1892.)

The amount of tin varies considerably in different cases, and the surface distribution is often very unequal. In many cases the tin-plating is apt to be thicker at the edge of the plate which leaves the rollers last. This is due to the accumulation of leavings from the last plate passing through. It is more or less incidental to manufacture, and in reporting on a tin it would be best to quote the lowest amount found per square centimetre or inch. In the trade the amount of tin is usually returned as so much per base-box. The base-box consisting of 112 plates of iron measuring 14 inches by 20 inches, and giving a total surface of 62,720 square inches, as the tin is deposited equally on both sides of the plate. This size of plate is commonly used for making cans for preserved foods. One authority lays down 2 lb. of tin per base-box as the lowest amount permissible; another states that 4 lb. of tin per hundredweight of tinplate is a fair average. Obviously such standards do not necessarily guarantee the thickness or surface distribution of the plating, and consequently afford no guide to the actual requirements for canning purposes. At one time sheet iron was coated with an alloy of tin and lead called "terne-plate," but nowadays this is rarely, if ever, used. It is, however, necessary to keep this fact in mind, owing to the ease with which lead may be absorbed by the contents of tins. The estimation of lead in

tinplate is best carried out by electrolysis as follows :— The plate is immersed in nitric acid, the resulting solution is diluted and electrolysed with a current of 3 ampères, when the lead is deposited at the anode as PbO_2.

To determine the amount of tin required to constitute a well-tinned can for preserving foods of all kinds, it was necessary first, as a guide, to estimate the amount of tin in various cans at present on the market. To carry out this analysis, all the usual methods for estimating tin in the presence of other metals were tried, but it appeared to me that, however carefully performed, all of them gave much too low a figure for the tin recovered. The large amount of iron present was a troublesome complication, necessitating a tedious and laborious purification to remove it from the final SnO_2 precipitate, and, in the case of volumetric analysis, it interfered to a great extent with the process, even when the tin was first converted to the sulphide.

The analysis of a sample of tinplate was as follows. It is apparently an average one, and shows the proportion of iron and other metals present :—

Iron	92·95
Other metals—Cobalt, copper, zinc, silica	4·39
Tin	2·66
	100·00

In my analysis I used a method kindly sent to me by Professor Walker, of the Research Laboratories of Applied Chemistry, Massachusetts Institute of Technology, which I have found to be in every way satisfactory, and which exactly fulfils the requirements of an analysis of this description. It is quite reliable and necessitates no great technical skill. In fact it can easily be carried out in district laboratories both at home and abroad.

The other methods tried may be classed under four headings :—

(1) Gravimetric analysis.
(2) Volumetric analysis.
(3) By electrolysis.
(4) By the formation of an amalgam.

The results obtained, as before stated, were unsatisfactory, but I give details in the form of an appendix which can be consulted by those interested in the subject.

The process I used consists in dissolving off the tin from the tinplate in a warm solution of dry chlorine in carbon tetrachloride or in fuming stannic chloride. Walker states that the latter is even a better solution than the former, being more active.

I have found this to be the case, although it requires no confirmation coming from such a high authority. The solution of the tin is very quickly completed, and no especial apparatus is required. Obviously the great advantage of the process over all others lies in the fact that the iron is not acted upon by the solvent, so that knowing the weight of the sample of tinplate, the loss in weight after removal of the tin represents at once the amount of tin present.

I have carried out the former process in the following way, which, I think, answers all requirements: In the first place, it is necessary to have pure dry chlorine gas. This is obtained as follows:—A 500 c.c. Jena flask is fitted with a three-holed rubber cork; in the centre hole is placed a thistle funnel with a bend, and in the second a tube bent at two right angles, with one end cut short near the bottom of the cork, and the other long enough to reach nearly to the bottom of a measure glass filled with water, which serves as a safety-valve in the event of a too rapid evolution of gas. The third hole has another tube bent at two right angles passing nearly to the bottom of a small flask containing water, which absorbs any hydrochloric acid that may come over. This flask is connected with a second and similar flask, filled with strong, recently-boiled sulphuric acid, in which the gas undergoes a preliminary drying. It is fed by another tube to a chloride of calcium tower, filled with fragments of pumice-stone moistened with sulphuric acid. This insures the thorough drying of the gas. From the tower it is led by a tube into the carbon tetrachloride.

To obviate the loss of the solvent due to evaporation, it was found convenient to employ the condensing apparatus shown in the photograph, which consists of a covered water-bath with a condenser attached. The chlorine is led into the solution through a connection at the top, and the excess escapes by a side opening. In this way it is possible to operate on six pieces of plate at once, a considerable saving of time.

Chlorine gas is evolved in the flask by heating granulated manganese dioxide and sodium chloride with strong hydrochloric acid. To insure the absence of air from the whole apparatus, the first gas evolved is led into a solution of sodium hydroxide, and only when this is near saturation point is the gas allowed to enter the carbon tetrachloride (see figure 2). I found that 1 square inch of the metal was a convenient size to work upon, and when estimating the varying degrees of thickness of a plate, 1 square inch was cut from different portions of the same can, and the results compared (see diagrams). The square of tinplate should be bent

across the middle so that it presents a free surface to be acted upon by the solution, or it should be raised by some means in the

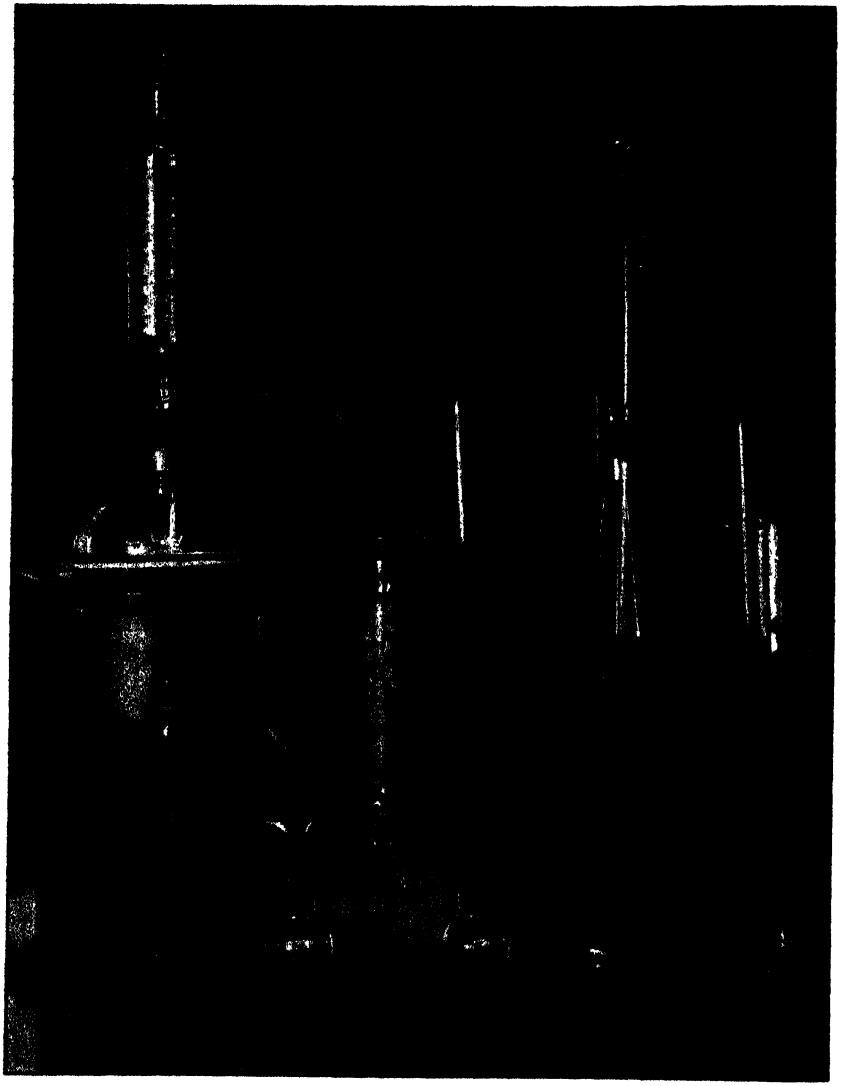


FIG. 2

fluid. The portion of plate must first be well cleansed with a soft rag dipped in ether, then dried, carefully weighed, and placed in

about 30 cc. of carbon tetrachloride in a small flask to the bottom of which the chlorine gas is led. This flask should be warmed during the operation, preferably on an electric plate. Where more than one piece of plate is to be acted on, the condenser method is preferable. During the operation the tin will be seen gradually to disappear, and the pieces of plate will assume at first a grey and then a red colour. The solution becomes at first yellow and opalescent, and from this gradually changes to a dull red. The tin is usually completely removed in two hours, and on removing the portions of plate at the end of this time they will show a red appearance which rapidly changes to a bright yellow colour. On washing the plates under the tap, they show the dull grey of metallic iron. Small portions of tin which may be left can easily be seen after polishing the surfaces with a soft rag. If any are found, the operation must be repeated for a further period. After washing, the squares are dried in the hot-air oven, cooled, and again carefully weighed. The difference in the two weights gives the amount of tin which was present on the sample.

To gain some information as to the amount of tin generally to be found in cans used for preserved foods of various kinds, twenty-nine different samples were examined, and the results are shown in the attached table. For convenience the amount per base-box has been calculated in each case, and a column showing this added, as it is the usual method of expressing the amount in the trade (see table of analyses).

Evidently the nature of the contents is not always taken into consideration when selecting the tinplate required. Thus it will be seen from the table that the highest amount found was in a can which contained arrowroot; four tins containing suet, biscuits, tobacco, and milk powder were below 2 lb. to the base-box.

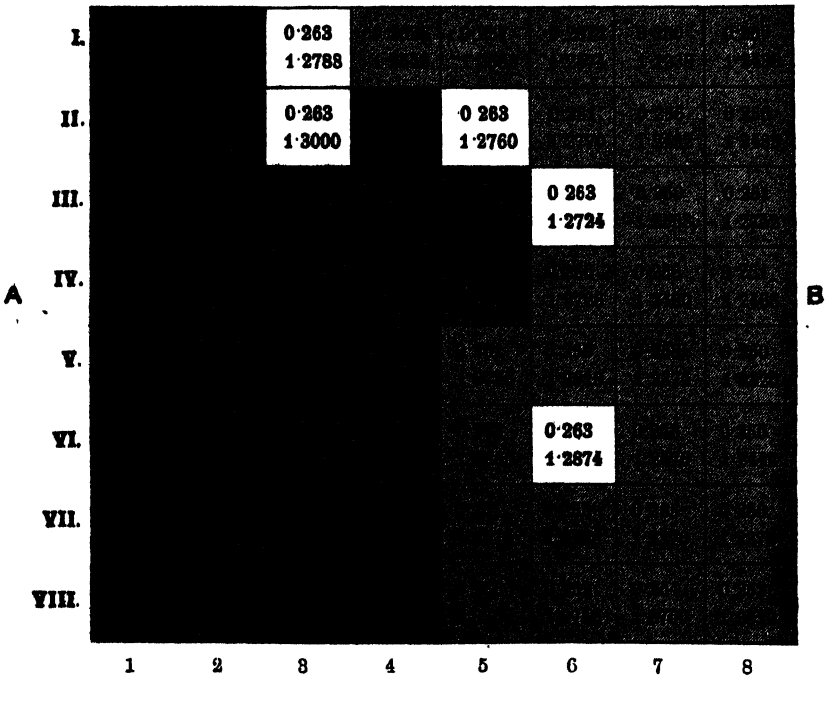
To determine the variations in the coating of tin on tinplate the following course was adopted :—

From the lid of a 20-lb. tea tin, a piece measuring 8 by 8 inches was cut with the greatest possible accuracy. This piece was then cut into sixty-four squares each measuring exactly 1 square inch. It was necessary to retain the squares in exactly the same relationship they held to each other before cutting, and to attain this the following device was adopted: A square 8 by 8 inches was mapped out on a piece of paper and subdivided into sixty-four squares, which were numbered. Upon these were placed the squares of metal numbered as they were cut, in their correct order. The thickness of each square was then taken in millimetres by means of a micrometer in the following manner :—

Five measurements of each square were taken—viz., one from as near each of the four edges as possible, and one from the centre of the square. Then the average of these was taken as the thickness of the square (see diagrams). This was done to ascertain whether the variations in thickness were due to unequal deposition of the tin plating, or to variations in the thickness of the iron base, or to both.

DIAGRAM I.

THICKNESS OF PLATE IN MILLIMETRES, AND WEIGHT IN GRAMMES, OF EACH SQUARE INCH IN A PIECE OF PLATE FROM THE LID OF A 20-LB. TEA BOX.



The top row of figures represents Thickness in Millimetres.
The lower row Weight in Grammes.

The pieces of tin were then cleaned with ether, dried in the oven at 120° C. for some hours, and then cooled and carefully weighed. The weights obtained were recorded in the same manner as the micrometer measurements; a mean of the thicknesses of all the

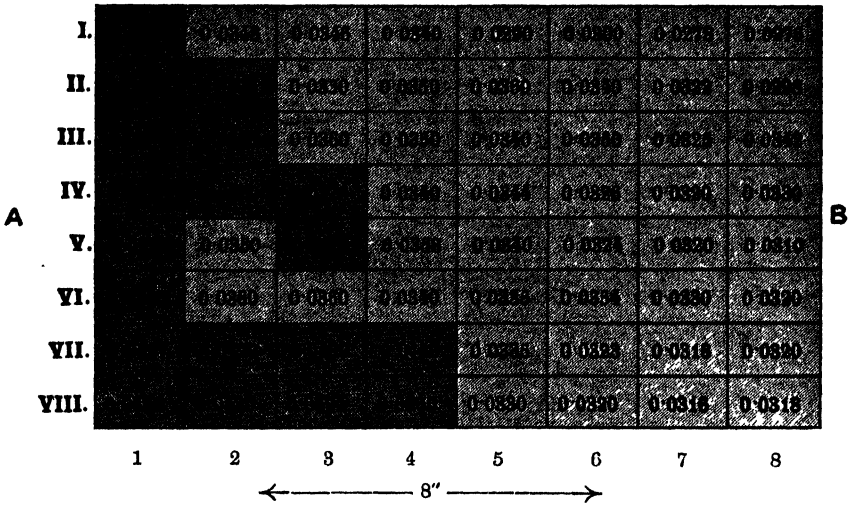
squares was taken, and both results are shown in Diagram I. The results are interesting.

(1) In this particular sheet of tinplate the micrometer measurements show that there is a considerable variation in the thickness of the plate. The variation is not of irregular distribution, but, as will be seen from the diagram, shows a distinct rise from the side B to A.

In most cases this rise is a gradual and unbroken one. This might well be accounted for by the fact that this sample had been cut from near the lower edge of a plate, where, as mentioned on p. 143, the tin is apt to accumulate when passing through the rollers. This is borne out to some extent, also, by the results of the analyses shown on Diagram II.

DIAGRAM II.

WEIGHT OF TIN IN GRAMMES FOUND BY ANALYSIS OF EACH SQUARE INCH OF SAME PIECE OF PLATE.



* Weight of Tin in Grammes.

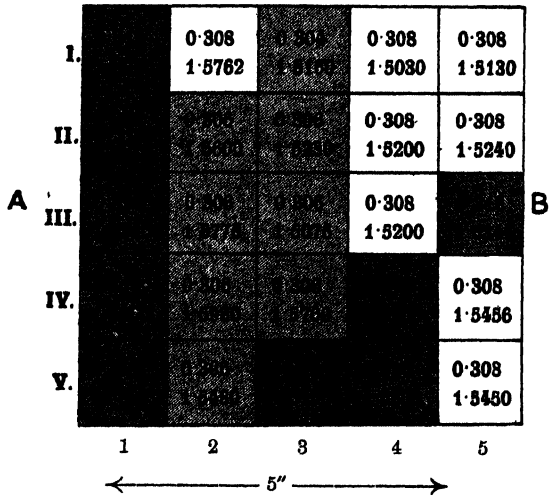
(2) In most cases the weight of the individual squares varied with the micrometer measurements, and also showed a rise from B to A.

The squares were then subjected to the action of the chlorine-saturated warm carbon tetrachloride for two hours (when it was found that a constant weight was obtained) to determine the amount of tin present. The results are shown on Diagram II.

prepared in a similar fashion to 1, for the purpose of comparison, and also in Diagram IV B. In Diagram II. the squares showing an amount of tin higher than the average are marked with crossed lines; those below, with single lines. The general tendency is for the deposit of tin to rise from B to A as in the case of the micrometer measurements, but the difference in the number of squares above the average can be accounted for by the fact that the micrometer measurement is one of averages, while the amount of tin is actual. The weight of tin corresponds fairly closely to the thickness;

DIAGRAM III.

THICKNESS OF PLATE IN MILLIMETRES, AND WEIGHT IN GRAMMES, OF EACH SQUARE INCH OF A PIECE OF PLATE FROM A BISCUIT BOX.



The top row of figures represents Thickness in Millimetres.
The lower row Weight in Grammes.

for instance, the square having the greatest thickness—viz., No. III., Row 1, Diagram I., 0,280 mm.—has also the greatest weight of tin (Diagram II.), while the smallest amounts of tin were found upon the thinnest squares.

The micrometer measurement bears some relation to the amount of tin present on a sufficiently small area in some cases, but would hardly serve as a guide without analysis.

In the case of eight-gauge plate, the micrometer measurements would probably not fall much below 0·400 to 0·450 mm. The micro-

meter measurement serves as a guide to the gauge of the tinplate, as the sample shown in Diagrams I. and IV. is obviously not so well plated as that shown in Diagrams V. and VI., and this is also borne out by the analysis of the tin present on the plates. A second examination was made of a piece of plate measuring 5 by 5 inches, taken from a biscuit box (see Diagram III.). In this case the piece of plate was cut from the centre of a side of the tin

DIAGRAM IV.

A.—Measurement of Thickness in Millimetres of each Square Inch of Same Plate as in Diagram III. after Removal of the Tin.

A

	0·260		0·260	
		0·260	0·260	
0·256	0·260	0·260	0·260	
	0·260	0·256	0·256	
0·252	0·252	0·251	0·252	0·249

B.—Amount of Tin found in Grammes on each Square Inch of the above Plate.

B

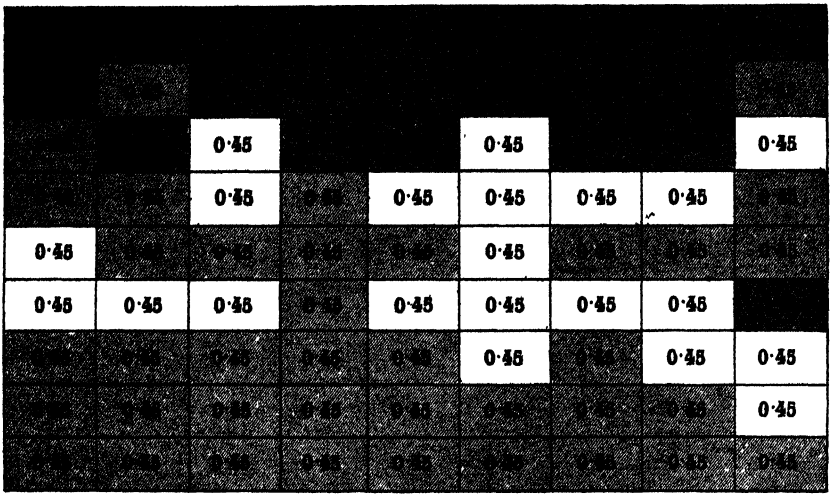
0·0290	0·0263	0·0260		0·0254
	0·0214	0·0276	0·0230	0·0243
0·0280	0·0205	0·0260	0·0210	

and the variation in the thickness of the tin layer is not so marked as in that shown in Diagrams I. and II. The weights in this case do not show any relation to the micrometer measurement. This can be accounted for in several ways—*e.g.*, the weight of the metal varies according to the composition of the iron base itself, which frequently contains proportions of other metals of different density.

It must be noted that the method of cutting the squares,

however carefully performed, does not, in most cases, produce squares of equal area. This accounts for discrepancies between the weight of contiguous squares, although the micrometer readings are identical. The impossibility of completely flattening the squares after cutting without re-rolling renders the average micrometer measurement only approximately correct, but it serves to indicate the general dimensions of the plate. If larger squares are taken, as in Diagrams V. and VI., the average should be considerably reduced.

DIAGRAM V.



(3) In the case of Diagram V., a piece of plate was cut 4½ by 4½ inches from a sheet of tinplate, gauge 8 (obtained by purchase from a tinsmith) in order to lessen the error arising from any bending of the plate or from minute areas of rust likely to be met with in a can that had been used.

It may be noted here that this apparently bright and well-plated sample was subjected to Walker's test, and showed the presence of numerous pin-holes. They were not appreciable to the naked eye. The plate was divided up into eighty-one squares, nine a side, with a pencil, and the whole plate without any cutting was gauged with the micrometer, the actual results being recorded on each square as shown in Diagram V. This sample was purposely cut two inches from the edge of the plate, and the micrometer

measurements show plainly that the plate is thicker, though only slightly, towards its upper edge, and thins off towards the middle.

In Diagram VI. a piece the same size was cut from a corner of the same plate, giving two free edges. There was a thick irregular layer of tin, plainly visible to the naked eye, at one edge of the base-box plate, which required no measurement to show that the tin was thicker, therefore the piece was cut from an opposite corner, where the plate appeared to thin off. This was shown to be the case by the micrometer measurements, so that it would appear that it is the lower edge which receives the most tin, and in cases such as shown in Diagram I. this was probably the case.

DIAGRAM VI.

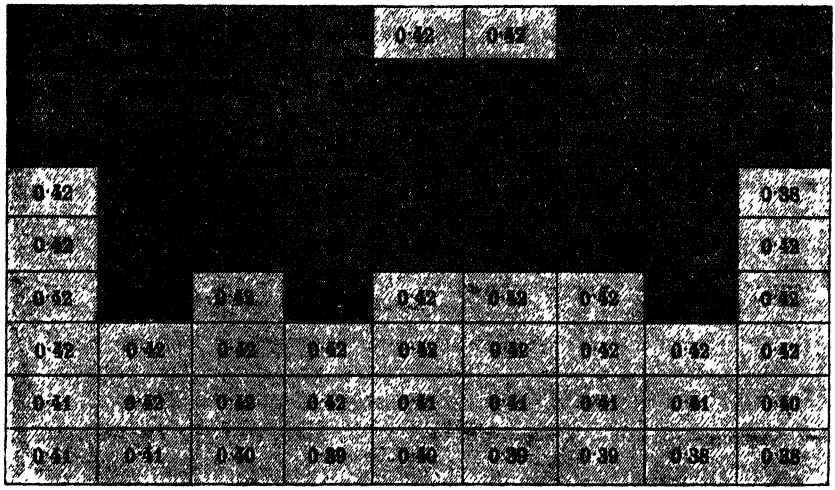


Diagram IV., A.—This records the thickness of the steel base used in the piece of plate shown in Diagram III. The measurements given were taken immediately after removal of the tin, so that errors from rust, which rapidly forms in the laboratory air, were avoided.

The micrometer measurements show a certain amount of variation in thickness, varying between 0·249 and 0·288 millimetres, so that the steel base is probably as liable to variations as the completed plate.

The amount of tin found on the same piece of plate which gave the above measurements is shown in Diagram IV., B.

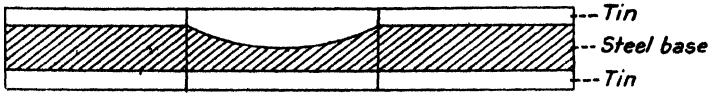
This does not seem to follow the micrometer measurements shown on Diagram III., but merely records a certain amount of unevenness of the plate, and bears out the necessity for the analysis of the tin per surface area in all cases.

It is obviously impossible to secure a perfectly even deposit of tin on the iron base, and really this is of no consequence, except to the makers, provided the thinnest parts do not fall below a certain standard, necessary to protect the contents from excessive metallic contamination, and the external surface from the formation of rust.

The deposit of tin must be thick enough to stand bending or the manipulation necessary in making the can, so that no cracks or fissures may be formed. Even in the thicker coating of high-grade plates, pin-holes are frequently present, but the better the plate the less risk there is from this source.

I had hoped that the micrometer measurements would have served as a guide to the depth of the tin laid upon the surfaces of the iron base. In this I was disappointed, for although the measurements sometimes approximate closely to the amount of tin present, very frequently they do not. The iron base itself may account for this, for in those cases where it is uneven and presents a dip, the amount of tin may here be greater than the average, although the thickness of the whole plate is the same.

My meaning will be made clear by the following diagram :—



A well-tinned can should show no erosion of the inner surface even after a period of several years. Some blackening occurs with moist or acid foods, but is not necessarily a source of any danger. An eroded surface points emphatically to the use of inferior plate in the manufacture of the can.

Although a certain amount of tin, generally below one grain per pound, is taken up after a time by most kinds of foods, no large amounts are likely to be found in the contents of a well-tinned can, and certainly the metal would not be present in a quantity sufficient to induce tin-poisoning.

Recently, the United States Department of Agriculture have ruled, pending further investigation, that all foods which are canned subsequently to January 1st, 1911, will be permitted

importation and interstate commerce, if they do not contain more than 300 milligrammes of tin per kilogramme, or of salts of tin equivalent thereto.

Conclusions.—The following suggestions are made tentatively :—

The tin should not fall below a given amount per pound to the base-box. This is a convenient standard, being the one generally used in the trade. The amounts given according to this measure are such as should guarantee that the tin in the weakest parts of the plate shall not fall below a sufficient quantity. They are, of course, to a certain extent provisional, and liable to alteration in the light of further observations. While accepting these standards it must be clearly borne in mind that they are the lowest amounts permissible, either on the base-box plate itself or in a can used for food.

(1) For cans to hold preserved meats, such as corned beef, the amount of tin per base-box of 112 plates measuring 14 by 20 inches, should be at least 2·5 lb., or an amount not falling anywhere below 0·0361 gramme to the square inch (both sides), to insure a fair distribution of the tin.

(2) For cans intended for such foods as fruits, jams, &c., owing to their acid nature, and for meat extracts, essences and highly salted foods, a layer of tin equivalent to not less than 3·5 lb. per base-box, or 0·0506 gramme per square inch (both sides).

(3) For dried foods such as biscuits, meal, &c., probably 2·25 lb. or 0·0325 grammes per square inch would be quite sufficient.

(4) In every case one-twentieth of the surface of the top, bottom, and sides respectively should be taken for analysis from the same can, and the lowest amount found on a given surface quoted.

(5) In all cases the layer of tin should be continuous and as evenly laid as possible.

(6) There should be no fissures and any surface extensively riddled with pin-holes as shown by the Walker test should lead to rejection of the plate. It is fair to state, however, that at the present time a certain number of pin-holes appear to be inevitable, but with improved methods of plating they are likely in the future to be almost entirely eliminated.

(7) The custom of painting the outside of the cans to prevent rust is a good one, and should be continued.

I am indebted to Major Wanhill, R.A.M.C., for suggestions concerning the micrometer measurements and to Lieutenant R. Gale, R.A.M.C., for great assistance in carrying out the analyses.

Appendix.

Methods for the estimation of tin may be arranged roughly under four headings, viz.:—

(1) By gravimetric analysis.

(2) By volumetric analysis.

(3) By electrolysis.

(4) By the formation of an amalgam.

(1) *Gravimetric Analysis.*—(*a*) The first method tried was the usual one of acting on the metal with strong nitric acid. The tin is thus converted into the insoluble metastannate, or β-stannic acid $Sn_5O_5(OH)_{10}$ and this is afterwards converted into the oxide (SnO_2) by strong ignition.

It was found that stannic oxide thus recovered contained a considerable proportion of iron and some silica. To remove these, considerable manipulation was required before purity could be obtained, with the probability of considerable loss of tin. The amount of tin recovered was consequently always too low.

(*b*) A method devised by Mainsbecq was then tried. The tin was cut up into small pieces and acted upon with strong hydrochloric acid. After being allowed to stand twelve hours, the iron crystallised out as ferrous chloride along with such metals as copper, antimony, &c. The liquid was then filtered, and in the filtrate the tin was determined by Lowenthal's method—viz., nitric acid was added for oxidation purposes, the solution neutralised by means of ammonia, and then made faintly acid with hydrochloric acid. The tin was precipitated as the hydrated stannic oxide by means of concentrated ammonium nitrate. This method was tedious, and the figures obtained were low.

(*c*) The next method tried was that of fusing the tinplate with cyanide of potassium. This promised well, but to insure accuracy tin must be present to the amount of at least 10 grammes. It is evident that to reach this amount in tinplate, so large a quantity would be required for an estimation as to make it impracticable in an investigation of this nature.

(*d*) An attempt was then made to estimate the tin by means of the following method:—

The plate was dissolved in strong hydrochloric acid, and the solution diluted with water. Hydrogen sulphide was then passed into the solution, and the stannic oxide obtained in the usual manner. The iron is not precipitated in acid solutions by hydrogen sulphide, but it was found that the stannic oxide obtained was never pure, and required further treatment which led to some loss. Filtration was also extremely difficult.

(*e*) Another method tried was treatment of the plate with nitric and hydrochloric acids, with precipitation of the tin by means of metallic zinc.

(*f*) As none of these methods after considerable trial and modification seemed entirely satisfactory, I then turned my attention to oxidation of the plate by means of fusion with sodium peroxide (Na_2O_2). An abbreviated account appears in the "Guide Pratique de l'Expert Chimiste en denrées alimentaires, Second Edition," but I was able to find the original paper by H. Angenot in the library of the Chemical Society.

I give the method in full, together with such detail as I have found of use in its practical working. The tinplate for analysis was cut into pieces 2 inches square, this size being chosen because it was found that smaller pieces gave too little tin for accuracy, and larger pieces require too much sodium peroxide, leading to considerable expense where many observations have to be made. It was found convenient, and a saving of time, to have a piece of brass, accurately cut to the afore-mentioned size, as a pattern with which to mark out the tinplate when cutting. The piece of plate, measured in this manner, was then cut by means of shears into strips of about 1 mm. wide. These strips curled as they were cut and this made certain that the metal was completely acted upon, as free surfaces were exposed to the peroxide. It was found that flat pieces stuck together at the bottom of the crucible, and the tin was not completely removed on the opposed surfaces. The pieces were then carefully weighed and the weight noted. They were then placed in an iron or Battersea-ware crucible about 3 inches high. In the bottom of the crucible was put first a layer of peroxide, and then the spirals of tinplate were introduced and more peroxide added until all were well covered.

Great care must be taken to transfer the peroxide with a perfectly dry spatula, otherwise unpleasant accidents may occur. It is a good plan to use a coin taken from the pocket for this purpose. The crucibles must also be perfectly dry. The lid was then put upon the crucible, which was heated at first gently and afterwards to a strong heat for at least six hours. It was found that thorough separation of the tin did not occur in less than that time. Heating is best done by means of a Fletcher burner, supplemented, after a time, by a forced blast. Heating in the muffle furnace generally causes the peroxide to overflow.

On completion of the fusion the crucible was allowed to cool and then placed in a large beaker on its side. About 150 cc. of hot water were added and the beaker covered. When all action had

ceased the crucible was removed after thorough washing, and the contents of the beaker made up to 500 cc. It was then boiled for five minutes and the precipitate of iron and other metals filtered off. The greatest care was taken in filtering, not only to make sure that none of the filtrate, which contained the alkaline stannate, was lost, but also to make certain that the filtrate was perfectly clear. Several decantations were necessary in many cases. The amount of iron present in the form of the oxide differed considerably in various samples. The clear filtrate or an aliquot part was then acidulated with sulphuric acid (1 in 20), a faint acidity only being necessary. On boiling, a flocculent precipitate separated out; this was tin, the other metals remaining in solution. The solution was then boiled for fifteen minutes and filtered through a close, dry filter. I find the filter papers of Dreverhoff, Nos. 400, 402, or 311, are the best for this purpose. The precipitate was well washed with distilled water, until all trace of acid was eliminated. The filter paper and its contents were then transferred to a porcelain crucible—platinum is not suitable—which was heated at first slowly and then in the blow-pipe flame, whereby the contents were converted into SnO_2. This precipitate was then weighed and the amount of metallic tin found by multiplying by the factor 0·78667. It was sometimes found that the precipitate was impure, and further treatment was necessary.

This method, although practicable, is very laborious. It requires special apparatus and reagents, and is, for laboratory purposes, expensive. In all cases the results obtained were too low, but in cases where there is much less iron than in tin-plating, it will undoubtedly answer well.

(2) *Volumetric Analysis.*—It is unnecessary to describe in detail the various methods attempted. All were impracticable, owing to the excessive amounts of iron present in the samples.

The following methods were tried:—

(*a*) Estimation with decinormal iodine in alkaline solution.

(*b*) Estimation with decinormal iodine in acid solution.

(*c*) Estimation by means of potassium dichromate.

(3) *Estimation by Electrolysis.*—The tinplate was acted upon by boiling sodium hydroxide solution until the tin was completely dissolved, a process which takes some considerable time. An aliquot part of the solution was taken, diluted, and then electrolysed with a rotating anode. The cathode was of copper and on this the tin was deposited. In this case it was difficult to secure a coherent deposit, and better results were obtained by electrolysis with oxalic acid or from an acid solution of the oxide. The deposit was not

absolutely pure, and the results were a little low compared with the carbon tetrachloride and dry chlorine process. For example, by electrolysis of a sample of tinplate from an American corned-beef can, the amount found per cent. was 2·03 as compared with 2·79 per cent. by the latter process. There are other modifications yet to be tried, but the process is always a slow one.

(4) *Estimation by Amalgam Formation.*—Tin, as is well known, forms an amalgam, and this was obtained by heating the tinplate with mercury. On further investigation, it was found to contain some iron also. Separation of the metals after removal of the mercury is tedious, and the results were not sufficiently accurate to warrant further experiments in this direction.

The following methods used in the trade to recover the tin from tin scrap or cuttings have also been found satisfactory on a large scale:—

The Bergse process has been used at Copenhagen for some years, and it is carried out thus: The tin scrap is placed in a tank containing stannic chloride without any preliminary treatment. The tin is dissolved by the stannic chloride, which itself is reduced to stannous chloride. The solution is then electrolysed, causing separation of metallic tin and regeneration of the stannic chloride. To deal with 10 tons of scrap tin in twenty-four hours requires a tank of 3,500 cubic feet capacity.

The Alkaline Stannate Process.—In this process the scrap is connected to the negative pole of a battery, and immersed in a solution of sodium hydroxide at 70° C.; on passing the current the sodium hydroxide is split up into metallic sodium and liberates oxygen, which unites with the tin to form sodium stannate. This is again broken up and metallic tin is deposited at the anode.

In Montague's process the scrap is treated in a closed chamber with hydrochloric-acid gas. When charged, a shower of water is introduced, and the tin is thus instantly converted to the chloride.

The Watt's process consists in dissolving the tin from the plate by means of perchloride of iron. Stannous and ferrous salts are thus formed.

In Carey's method the cuttings are treated with alkaline polysulphides containing sal-ammoniac, the tin being subsequently precipitated by hydrochloric acid as the sulphide.

The Sulphate of Copper Process.—The tin is dissolved as the sulphate and metallic copper are deposited. When the tin is all dissolved and the iron exposed, the iron precipitates the tin from solution, and is dissolved with formation of ferrous sulphate. The deposit of copper and tin is melted together and separated by the usual methods.

TABLE OF ANALYSES.

No.	Descriptions of sample can	Surface measurement of sample	Weight of sample taken (in grammes)	Weight of tin found in grammes both sides	Tin found, grammes per cent., weight for weight	Grammes of tin on 100 sq. in., weight for area	Amount of Tin per Base Box, both sides		Remarks
							Pounds (avoir.)	Grammes	
1	Corned beef	1 sq. in.	1·575	0·044	2·79	4·40	3·04	1,379·84	Well plated. Interior blackened, but no erosion
2	,, ...	,,	1·574	0·043*	2·70	4·30	2·97	1,348·48	Ditto
3	Strawberry jam ..	,,	1·815	0·030*	1·65	3·00	2·07	940·8	Bright
4	Peaches	,,	1·3632	0·046	3·38	4·60	3·18	1,442·56	Bright; a thin plate; tin blown, *see* below
5	,, ...	,,	1·475	0·0218	1·47	2·18	1·51	683·65	Tin blown, interior much denuded of tin; acidity of contents 0·595 per cent., as H_2SO_4
6	Suet	,,	1·469	0·0256	1·74	2·56	1·77	802·816	Bright; a thin plate
7	Dried milk	,,	1·210	0·034	2·81	3·40	2·35	1,066·24	Very bright, and apparently well plated
8	Powdered milk ..	,,	1·505	0·048	3·19	4·80	3·32	1,505·28	Bright, and a good plate
9	Half cream dried milk	,,	1·215	0·038	3·13	3·80	2·63	1,191·68	Dull
10	Cream milk powder ..	,,	1·230	0 033	2·68	3·30	2·28	1,034·88	Very bright
11	Full cream milk powder	,,	1·103	0·027	2·44	2·70	1·86	846·72	Dull, light weight
12	Ham and beef ..	,,	1·479	0·029*	1·96	2 90	2·005	609·44	Lacquered externally; dull, slight blackening in places internally
13	A sago tin	,,	1·504	0·043	2·85	4·30	2·97	1,348·48	Dull
14	Essence of beef ..	,,	1·7436	0·0586*	3.37	5·86	4·05	1,837·39	Bright; heavy
15	Coffee	,,	1·342	0·043	3·20	4·30	2·97	1,348·48	Bright
16	Biscuit	,,	1·4696	0·0622	4·23	6·22	4·30	1,950·59	Bright, from the lid
17	,, ...	,,	1·4696	0·0748	5·09	7·48	5·17	2,345·72	,, ,, ,,
18	,, ...	,,	1·5146	0·0352	2·33	3·52	2·43	1,103·87	Bright, from one side of box
19	,, ...	,,	1·5146	0·0366	2·41	3·66	2·53	1,147·77	,, ,, ,,
20	,, ...	,,	1·5146	0·0346	2·28	3·46	2·39	1,085·56	,, ,, ,,
21	Tea, 20 lb.	,,	1·2938	0·0474	2·99	4·74	3·28	1,486·46	Bright
22	Gooseberry jam ..	,,	1·6874	0·0448	2·65	4·48	3·10	1,409·28	Bright; inner surface shows crystalline appearance
23	Beef	,,	1·5340	0·0346*	2·25	3·46	2·39	1,085·06	Bright
24	Kippered herring ..	,,	1·5325	0·0205	1·33	2·05	1·42	642·88	Tin not blown; contents sound; inner surface denuded of tin, eroded in places and blackened
25	Sardines	,,	1·4896	0·0356	2·39	3·56	2·46	1,116·42	Dull
26	Biscuit	,,	1·5234	0·020*	1·31	2·00	1·38	627·20	Bright; thin; rusted in places
27	Tobacco	,,	1·4048	0·0288	2·05	2·88	1·99	903·16	Bright; thin
28	Tinplate 8 gauge ..	,,	2·3240	0·042	1·85	4·20	2 93	1,317·12	Bright; unused; a thick plate; square taken from a portion where no pin-holes were shown by Walker's test
29	Arrowroot	,,	2·074	0·079	2·44	7·90	5·46	2,477·44	Heavy, bright, and apparently a good plating

* Lowest amount.

NOTE UPON YELLOW FEVER, BILIOUS REMITTENT AND REMITTENT FEVERS IN WEST AFRICA.

By Sir RUBERT BOYCE, M.B., F.R.S.

In the February number of The Journal of the Royal Army Medical Corps Lieutenant-Colonel Birt drew attention to a very interesting and little considered observation—namely, the frequency of bilious remittent fever in Malta, as late as 1881, at a period when yellow fever was also not infrequent, and in an island, moreover, where there is no endemic malaria. This year, 1910, I have had occasion to investigate four small outbreaks of yellow fever in West Africa. In reviewing the history of that disease in Africa, the first two points which attracted my attention were:—

(1) The overwhelming abundance and distribution of the *Stegomyia calopus*, and

(2) The almost yearly occurrence of yellow fever, either in the form of outbreaks or sporadic cases, for the past hundred years. Until I came to examine carefully the hospital case-books and annual returns, both civil and military, I had no idea that yellow fever had been so prevalent. Of all the records, the most noteworthy and useful were those written by the former staff surgeons on the Coast, and, thanks to the kindness of Lieutenant-Colonel Sutton, these records were placed at my disposal in Freetown. Surgeons like Barry, Ferguson and Lawson, well-known authorities and fully acquainted with yellow fever, had written complete accounts of the epidemics which were then prevalent, and, from their descriptions of the symptoms and *post-mortems*, there is no doubt that they were dealing with the severe type of yellow fever. All these authorities were, moreover, agreed that the disease was of *local origin*, and many of them discussed the relationship of the disease to the "endemic remittent fever" of Sierra Leone, which was then, as now, the common fever. Some even pointed out that an attack of remittent fever protected from the severe yellow fever. These observers also noted the apparent immunity of the native blacks from the severe yellow fever of the whites. In the course of my investigations I also found, on carefully examining the hospital case-books, that it was obvious that yellow fever had been frequently diagnosed as such by hospital surgeons, but still more frequently misdiagnosed under a variety of other names, by far the commonest aliases being "remittent," "bilious remit-

tent," and "pernicious malaria." They were nearly always fatal cases. As the symptoms and *post-mortem* descriptions are given, there is no doubt as to the identity of the disease. Having thus proved the almost continuous record of yellow fever in West Africa, the next point to settle was how to explain the simultaneous outbreak this year of yellow fever in four separate foci on the Coast—namely, at Freetown, Seccondee, Axim, and Saw Mills. The theory of importation failed upon careful investigation to explain the outbreaks; there was therefore only left the endemic theory of origin. Reviewing the evidence on the spot in the British colonies and that already published by French and German medical authorities, in adjacent colonies, I have come to the conclusion that yellow fever is endemic to-day on the West African Coast, and has long been endemic. That being so, what is the constant source of the yellow-fever virus? It cannot be the whites, because they are not in sufficient numbers. In my opinion, the source of supply is furnished by the black races, and for this reason: It has been proved beyond doubt—notably in the 1909 epidemic of yellow fever in Barbados, which I also had an opportunity of investigating on the spot—that the native black inhabitants were more frequently affected than the whites. This same observation has been made many a time in the Southern United States. In other words, the black races are not naturally immune; colour is no ultimate protection. But, as I have stated, the former staff surgeons on the Coast noted that the native of the Coast appeared to be immune, and this is fully borne out by the experience of this year, for the deaths, with rare exceptions, occurred amongst the whites, for the most part recent arrivals. How, then, reconcile these two apparently conflicting statements? Simply by the fact that the Barbadian black, the descendant of the West African, has been living in an island where we know that yellow fever has been absent for very many years, in fact since the period when improved sanitation and an excellent pipe-borne water supply completely changed the mode of life of the inhabitants. Before this period we know positively that remittent fever, bilious remittent fever, and yellow fever were of annual occurrence, as can be readily seen from the military returns of those days. On the other hand, the agues were absent, for the simple reason that there are no anophelines in Barbados. The Barbadian black, the descendant of the African, therefore became a non-immune, and as liable to the disease as a newly-arrived white. The West African native, on the other hand, is still for the most part immune, because he is

continually subject from birth to infection by the stegomyia which is swarming around him. In other words, he gets one or more attacks of the well-known *mild* yellow fever in childhood and adolescence, which serve to partially, though not completely, immunise him; it protects him from the severe or rare type of yellow fever; but he carries with him sufficient of the virus in his blood to give infection to the stegomyia around him. This is equivalent to saying that yellow fever is endemic in the native race, just as malaria is. Lastly, I am of opinion that a vast number of the cases of "remittent" and "bilious remittent fevers" are only the mild and commoner types of yellow fever, and I take Lieutenant-Colonel Birt's evidence in the case of Malta, the evidence of Barbados, and the fact that remittent fevers were once, like yellow fever, common on ships, and that remittent fevers were also very common in the Southern States of America, as also in towns in Spain, as evidence in support of my contention that these diseases are very largely stegomyia fevers, and of the nature of yellow fever, and thus they will disappear, as they have in the past disappeared, after the enforcement of stegomyia destruction. That proportion o them which are, however, genuine malarial cases naturally will not be affected.

BLOOD-CULTURE IN TYPHOID FEVER.

By Major S. L. CUMMINS.
Royal Army Medical Corps.

A series of experiments on blood-culture in typhoid fever, published in The Journal of the Royal Army Medical Corps for June, 1910, appeared to indicate that a solution of 0·5 per cent. taurocholate of soda in sterile water might prove a useful medium for the early diagnosis of typhoid cases, and the method has since been tried in a series which forms the subject of this note.

The object in view was to attempt culture from small quantities of blood, such as could be obtained by finger puncture, and to compare the results with those obtained in a similar series of cases by Major Grattan, R.A.M.C., who employed vein-puncture and the extraction of a larger quantity of blood.

While anticipating that the latter method would give a higher proportion of positive results, it seemed worth while to ascertain whether a simpler method would at all approach it in efficiency.

In all, fifty-two cases were tested, four at the South-Western and forty-eight at the South-Eastern Fever Hospitals. Of the latter, nine cases subsequently proved not to be typhoid fever, and three others were regarded as doubtful, their clinical pictures not being conclusive and Widal's reaction negative. There remain thirty-six cases of typhoid fever, which, with the four undoubted cases at the South-Western Hospital, bring the total to forty cases.

The results are shown in the following :—

Week of disease	Positive	Negative	Total by weeks	Positive per cent.
Second week	9	11	20	45
Third ,, ...	6	10	16	37
Fourth ,, ...	1	3	4	25
Totals	16	24	40	40

It will be seen that a positive result was obtained in 40 per cent. of all cases, the percentage being higher in the second week than later in the disease. An average of only about 0·5 cc. of blood was taken, which, added to 5 cc. of bile salt water, gave a blood dilution of 1 in 11, and in view of the late stage of the disease at which the cases had arrived, this result is considered

encouraging. Major Grattan, dealing with cases of a similar class, obtained a positive result in 54 per cent., thus showing a decided balance in favour of vein-puncture, owing probably to the larger quantity of blood obtained.

When blood-culture is attempted under ordinary conditions, there is no doubt that vein-puncture is preferable, but it is probable that in remote stations or under active service conditions many early cases might be diagnosed by the method of finger-puncture and culture of the blood in a watery solution of taurocholate of soda, no more complicated apparatus being required than a glass phial or test tube for the solution, a few capillary pipettes, a needle and a spirit lamp. The method is most likely to succeed very early in the attack, just when the Widal reaction is still uncertain.

The strains isolated all gave the classical cultural reactions of *B. typhosus*, the media being observed for at least three weeks before being discarded, and all were agglutinated with high dilutions of an anti-typhoid serum. After a period of from two to six months' growth *in vitro*, all the strains were verified by being re-tested, gelatine-sugar media being used on this occasion to make quite certain that no gas formation took place.

They were also again tested with anti-typhoid serum and found to agglutinate rapidly and completely in a dilution of 1 in 200 (no higher dilution was tried on this occasion).

Of the sixteen strains isolated all were in pure culture except two. Of these one was mixed with a coccus probably derived from the skin of the finger. The other was found to be mixed with a Gram-negative rod very similar to *B. typhosus*, and from which it was separated with difficulty even on plating out the culture.

This organism deserves some mention, as it was almost certainly derived from the patient's blood, and was co-existent with typical *B. typhosus*. Motile when first isolated, it became of doubtful motility in culture. On agar and on "MacConkey" plates, it formed round, clear colonies, hardly to be distinguished from those of typhoid until several days had elapsed. Lactose maltose, cane sugar, mannite, raffinose, and salicin were acidified without formation of gas. Dulcite and inulin were unaltered. Gelatine was not liquefied. No indol formed in peptone water up to eight days; litmus milk, at first slightly acid, was clotted by the seventh day. The organism was agglutinated neither by the patient's serum nor by an anti-typhoid serum of high titre. It greatly outnumbered the *B. typhosus* in the culture; but the latter, when isolated, was quite typical in every respect,

and the patient's serum gave a Widal reaction positive to 1 in 200 with *B. typhosus*.

In several cases where *B. typhosus* was not isolated, contaminations occurred in the bile-salt water blood mixture, these being probably derived from the skin. This result was disappointing, as there was experimental reason to hope that contaminations would be retarded almost entirely by the bile-salt. I am satisfied, however, that this salt greatly reduces the liability to contaminations, though it does not afford an absolute guarantee against them. Since the publication of a preliminary note on this subject in THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, for June, 1910, further experiments have been made to compare the bile-salt water method with that of Gildmeister, in which water alone is used. When the stock *B. typhosus* (B. Rawlings) is used, the differences in favour of the bile-salt water method are very marked, but this strain has but a small resistance to the bacteriolytic substances in blood. When, however, a virulent strain is employed, and a higher dilution (1 in 11) used, the method of Gildmeister gives good results, and its simplicity is greatly in its favour. A comparison of the methods, as applied to alternate cases in a series, would be of interest, and it is hoped that an opportunity will arise to carry it out.

In conclusion, I desire to express my thanks to the staff of the South-Eastern and South-Western Fever Hospitals, and especially to Dr. Turner, without whose kind help this investigation could not have been carried out.

STERILISATION OF WATER ON A LARGE SCALE BY MEANS OF ULTRA-VIOLET RAYS.

By MARK FOULDS.

There are two problems of industrial water sterilisation: The first one consists in obtaining water perfectly free from germs, that is to say, absolutely sterile.

The second problem is that of obtaining water which is fit for public distribution as drinking water, and which is not likely to act as a propagator of infectious maladies, such as typhoid fever and cholera.

The former problem, that of obtaining absolutely sterile water, presents itself chiefly in its application to medical practice, surgery, gynæcology, &c.

This problem has been commonly solved in the following manner :—

(1) Heating the water to a high temperature during a considerable period, in some cases even under high pressure.

(2) Adding to the water chemical products such as carbolic acid, and during later years treatment with ozone.

The problem of producing a drinking water for public distribution which will not propagate maladies has been most commonly solved by more or less frequent filtrations of the water through sand filter beds of various density. These filtration plants keep back most of the microbes and give a relative security to the inhabitants of a town where such system is used.

Another process has been frequently advocated in the last few years, viz., adding to the water certain chemical products, such as salts which form precipitates, chlorine, which in itself is a strong bactericidal agent, or oxidising substances, the principal of which is ozone.

Filtering plants have had a very wide application in all countries; there are, however, a number of important disadvantages in their use. The first cost of such systems is very high owing to the large area necessary on account of the slow speed at which the filtration must be carried on in order to be effective. Even under these conditions the action is not absolutely certain.

The systems which advocate the addition of chemicals for sterilising or, to be more accurate, for disinfecting water, have not had general approval, due largely to the aversion of the public to anything being added to its drinking water.

Sterilisation by the ozone process has been tried on a very large scale in different cities; nevertheless, only a few installations have been made. One of the disadvantages of this system is the disagreeable taste which ozone gives to the water and which only disappears after the water has been standing for a considerable time. Another objection is the difficulty of producing ozone without at the same time producing nitrous acids, the presence of which absolutely condemns water for drinking purposes. The first cost and the maintenance of the ozonising plants are extremely high, on account of the intelligent attention and consequently costly supervision which they require.

All these different processes, whether for dealing with small or large quantities of water, have found a very serious competitor in the methods of treatment employing ultra-violet rays, it having been frequently demonstrated that sterilisation by means of ultra-violet rays is not only safer than by any other method, but also infinitely simpler and cheaper.

The physicist has known the ultra-violet rays for a long time; he produced them in his laboratory by different methods, principally the carbon bisulphide lamp, or the arc between metal electrodes. The first production of ultra-violet rays for medical purposes was in the apparatus of Professor Finsen for the treatment of lupus and other maladies; Finsen used for his purpose the arc between metal electrodes, or a series of discharge gaps constructed of iron or other metal. These sources of ultra-violet rays are, however, complicated, and have scarcely found application for other purposes than for those indicated by Finsen himself.

The quartz mercury vapour lamp, however, represents the first really convenient source of ultra-violet rays, this lamp being similar to Finsen's, in so far that the electric arc is produced between metal electrodes, in this instance, mercury.

This mercury arc has been studied particularly by Arons and by the American engineer, F. Cooper Hewitt, the latter's work resulting in the developing of the well-known Cooper Hewitt lamp, which consists of a long tube and has been largely applied for general illumination and photographic purposes.

An advance was made in the design of mercury vapour lamps when Schattner and Kuech enclosed the mercury arc in tubes of fused rock-crystal, whereby they obtained a very strong source of ultra-violet rays. The presence of these rays was, however, a disadvantage for an illuminating lamp, the rays themselves being injurious to the eyes. The tube of the Cooper Hewitt lamp is

manufactured of glass, which completely absorbs the ultra-violet rays produced in the interior of the tube. It is on this account that the light obtained from these lamps is in no way harmful.

Quartz mercury vapour tubes were first applied exclusively to

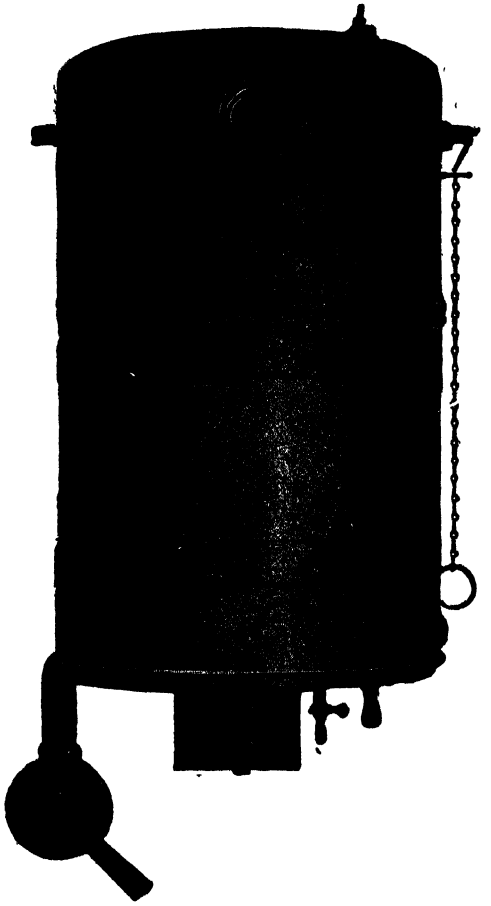


FIG. 1.—Outside View of Water Steriliser.

illuminating lamps, it being well understood that the tubes were enclosed in glass globes so as to protect the public against the enormous quantity of ultra-violet rays which passes through the fused rock-crystal, of which the tubes themselves are made. Such quartz mercury vapour lamps are being made at the present time

by the Westinghouse Cooper Hewitt Company in London and Paris, and by the Quartzlampen Gesellschaft in Hanau. The former Company has studied jointly with Messrs. von Recklinghausen, Henri and Helbronner, the application of this mercury vapour lamp (known as the Westinghouse Silica Lamp) to other

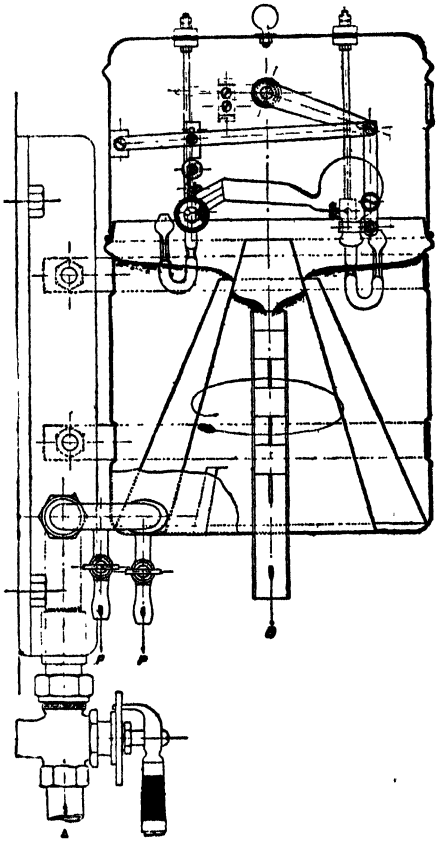


FIG. 2.—Interior View of Water Steriliser.

than illuminating purposes. These studies began with the particular application of the ultra-violet rays to the sterilisation of milk and water. This work has since been taken up in a good many other laboratories, it now being a question of almost general knowledge that dangerous microbes contained in water are killed

with quite remarkable speed by means of the ultra-violet rays emitted.

The work done in this matter has enabled the Westinghouse Cooper Hewitt Company to produce water-sterilising apparatus for different conditions.

The first apparatus developed, known as the Westinghouse Steriliser, types B. 1 and B. 2 (figs. 1 and 2), gives in the simplest possible manner a continuous supply of sterile water at the rate of 130 gallons per hour, such quantity being quite sufficient for most medical uses.

The normal illuminating lamp, consuming 3·5 amperes at 110 volts, is suspended in the apparatus immediately above the surface of the water. The apparatus itself is enamelled white, this finish inside giving a good reflection of the rays, thereby increasing the efficiency.

The water in the apparatus is under violent agitation and is exposed for about five seconds to the influence of the rays from the lamp. The agitation of the water is obtained by passing it through conical baffles which are placed inside the apparatus for the purpose of submitting with certainty every particle of the water to the influence of the rays, also repeatedly turning over any dust particle which might be floating in the water and so form a shadow over the microbes.

The few seconds that the water remains in the apparatus do not allow it to take the taste of the ozone which in small quantity surrounds the lamp, but which has been definitely shown to be without effect on the process of sterilisation going on. The water does not in any way change in its chemical composition; there is no evaporation of the dissolved gases and no precipitation of the soluble salts. The water leaves the apparatus as it enters it, with the exception that all life is annihilated.

Another apparatus producing about the same quantity of sterilised water has been put on the market. This, however, operates on a different system in so far that the lamp is submerged, it being claimed that a greater number of the rays emitted by the lamp are utilised for the purpose of sterilisation. It must, however, be borne in mind that the normal working of the lamp is seriously modified by the chilling effect of the water, on account of which there is an infinitely lower production of rays which is not compensated by the better utilisation of those which are produced. The chief disadvantage, however, is that the luminous tube becomes gradually coated with scale from the salts contained in the water,

which renders opaque the otherwise transparent tube and prevents the ultra-violet rays from entering the water, in consequence of which sterilisation is arrested.

The sterilisation of large quantities of drinking water for public distribution has been the object of numerous tests, which are referred to in the following publications: *Comptes-rendus, Académie des Sciences*, April 11th, 1910. "Sterilisation de grandes quantités d'eau par les rayons ultra-violets; Note de MM. Victor Henri, André Helbronner et Max de Recklinghausen; Note présentée par M. Dastre à l'Académie des Sciences (these experiments were based on early researches at the Sorbonne University)." *Comptes-rendus*, January 3rd, 1910. Cernovodeanu et Victor Henri.

Experiments to test the efficiency of the apparatus for this purpose were made by artificially polluting the water which entered the apparatus. The lamps were suspended above the water and maintained at a short distance from the surface by means of floats. These experiments also showed in a striking manner the importance of having the water violently agitated, and this experience has been used in the construction of new apparatus. These early experiments showed that sufficient sterilisation of drinking water could be obtained with a maximum expense of thirty-six watt hours per cubic metre.

In carrying out their experiments Messrs. Henri, Helbronner and Recklinghausen tried to increase the bactericidal action by utilising a larger number of the ultra-violet rays generated than is possible where the lamp is merely suspended above the surface of the water. It is, however, highly important that the lamp should burn in a normal manner, that is, under the same conditions as to temperature, &c., as in illuminating outfits, in which case the light-efficiency of the lamp can be checked by testing the current and voltage.

For the efficient operation of a quartz lamp, it is necessary that the luminous tube should be at a high temperature (about 800° C). If the lamp is artificially cooled, either wholly or in part, as is the case when it is submerged in running water, this high temperature cannot be obtained and the light-efficiency of the lamp is seriously reduced.

It may be mentioned that a lamp for a 110-volt circuit, such as is utilised in the small Westinghouse steriliser already described, should be adjusted to 75 volts across the tube, and in the case of the 220-volt lamp, 150 volts across the tube. The normal current of 3½ and 3 amperes respectively is obtained after fifteen minutes running: the efficiency is then at the maximum.

In all Westinghouse sterilising outfits the quartz lamps run under conditions corresponding to those in ordinary illuminating outfits, consequently at their highest efficiency.

In dealing with water sterilisation on an industrial scale, the Westinghouse Cooper Hewitt Company, Ltd., have thought it

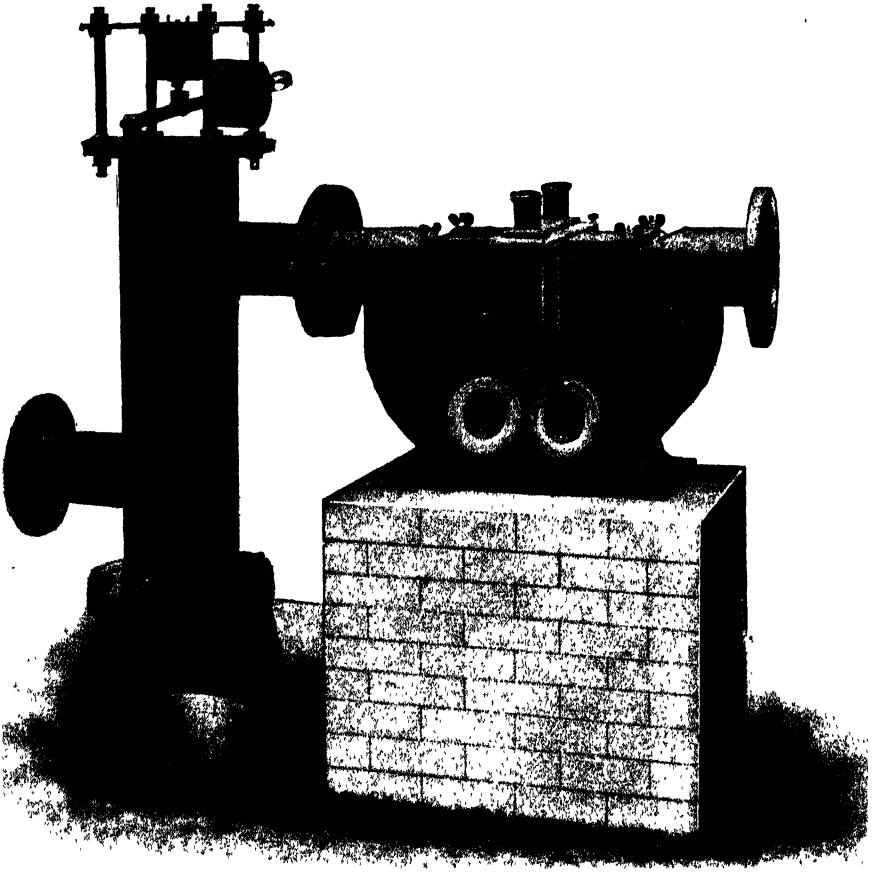


FIG. 3.—Exterior View of C 3 Apparatus.

desirable to develop a single unit, such as shown in figs. 3 and 4, one or several of which may be set up according to the quantity of water demanded. This unit will sterilise at least 600 cubic metres (132,000 gallons) in twenty-four hours, and is, as already mentioned, fitted with one 3-ampere 220-volt lamp.

The unit consists essentially of three parts, viz., the special cast-iron chamber E (fig. 4), in which the water comes under the influence of the ultra-violet rays, the special box with cut rock-crystal windows, into which the lamp is fitted, and the special automatic deviating valve which ensures that no water shall pass through the sterilising chamber at such time as the lamp is not in operation.

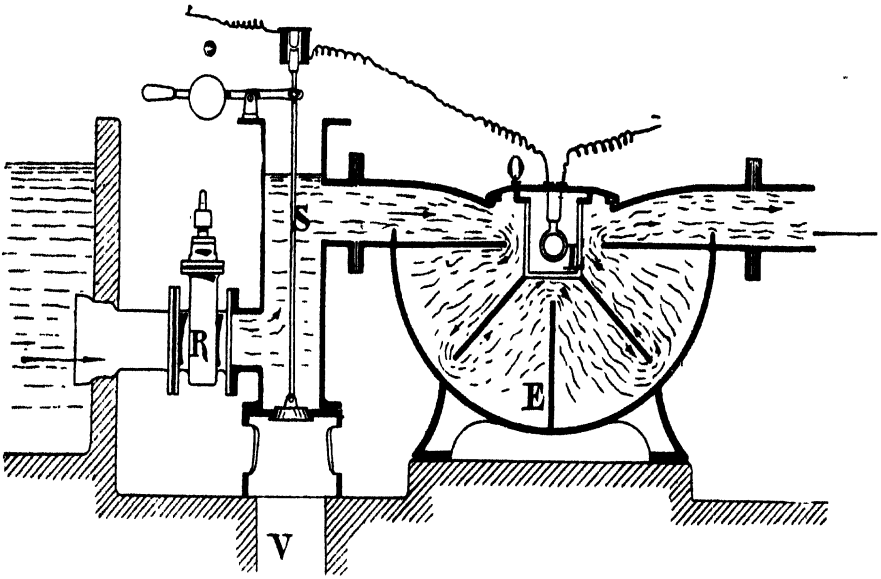


FIG. 4.—Interior Connections of C 3 Apparatus.

The chamber E, through which the water passes, is fitted with several baffles for directing the flow. These serve the purpose of thoroughly stirring up the water which, as already pointed out, is necessary for the proper treatment, and brings the full quantity of water under the direct influence of the light on three distinct occasions.

The lamp box I makes a water-tight joint with the containing vessel E, being held in position by means of four bolts with wing nuts, the box itself forming an obstacle in the path of the water. The three sides of this box in the path of the water are fitted with windows of cut rock-crystal, which provide free passage to the ultra-violet rays emitted by the lamp and through which they pass into the water flowing in the chamber.

The deviating valve V is placed between the supply and the steriliser apparatus, and consists of a double T-piece fitted with a mushroom valve at the lower end, this valve being held closed by means of a solenoid energised by the current flowing in the sterilising lamp. Should the current be cut off for any purpose, this valve would be immediately opened and the water would cease to pass through the sterilising chamber. This automatic deviating valve can readily be fitted with a bell or luminous signal, so as to attract the attention of the inspector of the plant.

On entering the apparatus, the water passes through the supply valve and over the deviating valve V into the chamber E. The flow, as directed against the first window of Box I, by means of a baffle, is then sent to the periphery of the chamber, and back again to the second or horizontal window; thence it passes back to the periphery of the chamber round a further baffle to the third window, thus coming under the direct influence of the ultra-violet rays on three distinct occasions.

In the event of the lamp not being in operation, the deviating valve V would be open through which the water would pass; in this way it is assured that nothing but sterilised water can be distributed to mains.

A Westinghouse steriliser of this type (although in a somewhat less perfected form) has been in service for a considerable time at the Competitive Exhibition for Sterilising Apparatus at Marseilles. The table shows the results of a few of the tests which have been made with this apparatus. (See page 176.)

From this table it will be noted that the quantity of water passed through the apparatus was in nearly every case more than 600 cubic metres per twenty-four hours. At certain periods of the test an even greater flow of water was available, and even under these conditions the bacteriological results were no less satisfactory than those cited above.

The table shows that the water leaving the apparatus was in the majority of cases sterile, there being an entire absence of germs; in no case did tests reveal more than 10 germs per cubic centimetre; on no occasion even, when testing with 200 cc., was a *B. coli* found.

The water which had been treated in an apparatus of this description can, therefore, be safely classified amongst the "perfect" waters, according to Miquel's definition, whilst the water which was fed into the apparatus could scarcely be called potable, it being far too rich in coli bacteria.

Experiment No.	Cubic metres water per 24 hours	Watt hours per cubic metre	Before Steriliser			After Steriliser		
			B. coli per litre	Germs per cubic centi-metre	Moulds per cubic centi-metre	*B. coli* per litre	Germs per cubic centi-metre	Moulds per cubic centi-metre
1	More than 600	Less than 26		158 174 148			0 2 2 0 0	8
4	More than 600	Less than 26	100 to 200	220 260		0	2 2	
7	More than 600	Less than 26		22 18	2		0 4 0 0	2 10
10a	More than 600	Less than 26	500	36 36 40	2	0	0 0	3
12a	560	28	80	22 20 18 24 16		0	0 0 0 0·5 0 0	3 1·5
12b	More than 600	Less than 26	50	48 52 44	2	0	0 0 0 0 0 0	6
13	More than 600	Less than 26	50	24 30 14		0	0 2 6 0	
14	More than 600	Less than 26	200	30 38 20			10 6 0 4 1	2
18	More than 600	Less than 26	500 to 1,000	43 60		0	0 0 0 0 1	

The presence in some cases of a greater number of moulds in the water after passing through the apparatus is due to the lack of protection of the opening from which the test water was drawn, whereas the valve between the supply and the apparatus was well protected against dust and wind.

The water with which the apparatus was fed during the Marseilles tests was clarified by the installation of roughing filters and prefilters of the system "Puech and Chabal, Paris." The installation produced a perfectly clear water from the very muddy supply of the River Durance. This water was in most cases quite opaque, even through a column of one metre long.

The above tests carried out by independent authority have clearly demonstrated the possibility of producing a perfect drinking water for public distribution with a consumption of twenty-six watt hours per cubic metre, a single apparatus being capable of dealing with fully 600 cubic metres in twenty-four hours.

In view of the extreme simplicity of the apparatus and the low power consumption, it would appear that there is a wide future for this new system of sterilisation.

United Services Medical Society.

RECENT TENDENCIES IN THE DEVELOPMENT OF ARMY MEDICAL SERVICES.

By Lieutenant-Colonel M. W. RUSSELL.
Royal Army Medical Corps.

When I was asked to read a paper before the Society it struck me that there were certain points relating to military medical organisation and our work in war, more particularly in regard to recent and prospective developments, which might interest you and afford a profitable subject for discussion. We cannot afford to stand still in this domain of our work any more than we can in any other.

Our guides are, of course, the official manuals, but the rapidity with which these themselves succeed and replace each other is evidence of the close study which is given to passing events, and to the efforts made to accommodate our methods to the lessons which they teach. The experience of actual wars is the main factor in bringing about changes; we have seen how profoundly our old organisation was modified by experiences in South Africa; there has recently been another great war, and we observe its influence in developments which have since taken place in our own and other armies. Usually great and radical alterations are due to actual war experience, but many minor modifications are often the result of practice operations on manœuvres or similar peace exercises.

All I wish to point out is, that constant vigilance is necessary in order to appreciate the trend of development, and the alterations which may prove to be necessary, and I believe there is no better way of eliciting and defining this appreciation than by discussion.

In studying the experiences of a war it does not do to take them too literally. Because a certain thing has happened in one war, it cannot be argued that it will certainly happen again under similar circumstances; but if a certain thing happens repeatedly during the course of a campaign, there may be good grounds for assuming that it, or something like it, will recur in future wars.

For instance, though the battles in the Manchurian war lasted over long periods of time, up to ten or fourteen days, we cannot

argue that battles in campaigns to come will last as long; but, as all the big engagements in the Manchurian war took much longer to decide than similar battles in previous campaigns, we may fairly infer that serious engagements will take longer to be brought to an issue in the future than they have done in the past. This deduction is now, I think, generally accepted.

The lengthening of the duration of the fight is due mainly to the development of the weapons used. Their low trajectory, longer range and increased rapidity of fire have rendered many things impossible now which could formerly be done. Troops, having committed themselves to a position within effective range, can advance but slowly, whilst retirement has become a most costly process. They have therefore to hang on. This has a very material effect on the medical work. Carrying away wounded under fire on stretchers has become an impossibility, unless exceptional cover is available. The lesson was not learned at once, and both Japanese and Russians lost heavily in their medical *personnel* until it had been grasped. In the later engagements the Japanese did not attempt to carry away wounded until firing had ceased, or until darkness had supervened.

Wounded unable to get away themselves will therefore lie long in the fighting area, before they can be retrieved. All that it will be possible to do will be to drag them into the nearest available shelter, and to collect them into clusters, spoken of on the Continent as "nests."

They will have to be attended to in these places for some time by the regimental medical *personnel.*

This has not been lost sight of by our keen-sighted continental neighbours, nor by ourselves. If you scan the organisation of the chief military Powers, you will see everywhere a tendency to add to the resources of the regimental *personnel.*

This has been done, not so much by adding to the numbers, as by improving their training, more closely defining their position, and increasing their dressing material.

Comparing the medical *personnel* of battalions on a war footing in the armies of the great military Powers, we find that they conform largely to one type.

Each battalion has two medical officers, four or five men of the medical corps, and sixteen stretcher-bearers.

A point to note is that they all have a specially trained medical *personnel* in addition to the medical officers and stretcher-bearers.

Our present organisation compares fairly closely (one medical

officer, five men of the Royal Army Medical Corps and sixteen stretcher-bearers—bandsmen). But there are points which require a little elucidation.

The men of the Royal Army Medical Corps with us are attached, as you know, mainly for water duties, disinfection duties, and the care of the sick of the unit until they can be removed to hospital. The book is silent as to their employment in action.

Their use in this connection was criticised on the manœuvres at Salisbury, the argument adduced being on the following lines: There is no greater safeguard for the health of the troops in war than a pure water supply. To neglect this safeguard is culpable. There is no time in war when men are more thirsty and more in need of pure water than in action; therefore, if the men do not get it then, there is little use in their getting it at all.

I think you will see the fallacy of this argument. Let us try and apply it to another condition.

There is no greater safeguard to the lives of men going into action than cover. To neglect this safeguard is culpable. There is no time in action when men are exposed to such danger to life as at short range. Therefore, if the men do not then get cover, there is little use in their having it at all. Does the argument not overlook the fact that there is a time in war when every precaution, be it sanitary or be it military, must be disregarded to attain the one great end which war subserves—the defeat of the enemy? These moments occur only occasionally, and to say that precautions unattainable then are therefore unfruitful at other times, which are themselves much more lengthy, is not a tenable proposition.

Further, if the water *personnel* were not withdrawn the troops could not benefit in action, as the carts would be miles away with the second line transport. I think, therefore, there can be little doubt in which course the advantage lies.

If the work of the medical *personnel* with regiments is in future to partake more of the nature of that of dressers than of bearers, as everything seems to show, these Royal Army Medical Corps trained men will be invaluable to the regimental medical officer in action. One would like, therefore, to see it definitely laid down in the book that four of this *personnel* will accompany the medical officer into action, the remaining one being left behind to bring up the water carts as soon as that becomes possible. To make them more useful one would like to see the one surgical havresack now allotted to a battalion increased to four, one to be carried by each of these men; this would make the regimental medical officer much happier, and

much better equipped for the work which he will have to do when severely wounded are left long on his hands, as we must expect they will be before they can be retrieved

A word with regard to the stretcher-bearers.

Germany has recently led the way in making her stretcher-bearers Geneva Cross *personnel*. France and Austria have followed suit. This means that sixteen men per battalion, in addition to the technical medical *personnel*, are maintained and trained solely for medical duties. Bandsmen are used as auxiliary stretcher-bearers only. The bearers are no longer men temporarily withdrawn from the fighting line. They are now enabled to devote the whole of their time and energy to their special work and to attain a much higher degree of proficiency. This arrangement has the further great advantage of rendering them immune from capture as prisoners of war, so that the Powers mentioned can now, without depleting their medical units, leave behind a proportion of their regimental medical *personnel* with wounded, whom they may have to abandon, comfortably conscious that the wounded will have attendance, that their own *personnel* will be returned as occasion offers and that their medical units, which are so difficult to replace, will be left intact. Medical *personnel* from a battalion which has suffered severely might be much more easily spared than *personnel* from a medical unit, which at such times would be anything but overmanned.

The development is one which will bear thinking over, and acquires additional significance from the fact that the Geneva Convention requires a belligerent to leave behind a proportion of medical *personnel* with wounded whom he cannot carry away.

To turn to another subject.

There is a paragraph in the Field Service Regulations, Part 2, Section 75, which gives as one of the duties of the regimental establishment: "To direct cases able to walk to the collecting station, which is a well-defined spot, previously notified for the purpose by the administrative medical officer of the division."

This "collecting station" flashes into view like a meteor in this paragraph, and is not heard of again by name. I do not say this by way of criticism (the Field Service Regulations is not the book for detailed explanations), but merely to draw attention to the fact that the paragraph has given rise to much discussion.

To obtain a clear conception of what is meant, we must first clear the ground of old ideas. We "must be off with the old love before we are on with the new." This collecting station has

nothing to do with what we used to understand by the term. It is not an intermediate point between the regimental and field ambulance lines; it does not lie with either of these lines of themselves to appoint it. Note the wording of the paragraph; it is fixed *previously* to their going into action, and is notified to them; further, it is fixed by the administrative medical officer, and is therefore a divisional arrangement.

Let us try and picture what happens. An army is marching to meet its opponent; it comes into touch, an engagement is imminent. The General Officer in Command naturally takes some little time to reconnoitre the ground and the dispositions of his enemy. He decides to attack, formulates his plan, and issues his orders. His divisional generals in their turn make their dispositions and issue their orders. Administrative medical officers are made acquainted with these, and on them frame their own orders. If time allowed, they might send for the officers commanding field ambulances and all medical officers with units, and explain to them as much of the plan as it would be advisable for them to know. One point which would concern them all would be the position assigned to the collecting station; the regimental medical officers would not need to be told anything more, they would then be in a position, and it would be incumbent on them, to make the place known to their respective units.

If time would not allow of this, as might often be the case, the position chosen for the collecting station might be made known in operation orders, but there is an objection to putting in these orders anything which can be notified otherwise. Publication or non-publication in orders would be decided by the General Staff according to the circumstances of the moment.

Let us suppose that the action is to commence in the early morning; preparations would be made overnight. The troops would be bivouacked or billeted within marching distance of the expected field. The administrative medical officer, of course in conjunction with the divisional commander or his staff, fixes on a village or group of buildings within this area as the collecting station for his division, and tells off one or more tent subdivisions or sections of a field ambulance to occupy it, if not already installed there. It would be on the main line of retirement, close to a road, a place to which wounded men would naturally gravitate when finding their own way back. The mentality of the soldier, especially of the wounded soldier, must always be borne in mind. The remaining field ambulances would at once empty themselves

into it, and regimental medical officers would be instructed to send direct to it in the morning any men of their units unfit to march into action. In this way the mobility of the field ambulances would be preserved. Further, men falling in the early stages of the fight might be sent direct to this place, thus rendering it unnecessary to open the field ambulances prematurely. Remember, to open a field ambulance is to immobilise it, and this should be deferred as long as possible.

But the great function of this collecting station will be to act as, what is called in continental armies, the "slightly-wounded station."

The experience of recent battles shows that from the commencement a trickle of wounded begins to flow back. The trickle gradually becomes a stream. Follenfant tells us that 50 per cent. or more of the Russian wounded found their own way back, the bulk of them evading the dressing stations; and Schaeffer says that, having no fixed point on which to rally, they wandered about like sheep without a shepherd, and usually made for the place where they were last fed.

Notwithstanding this large number of men who avoided the dressing stations, the following is the description of a Russian dressing station at the battle of the Shaho, given by a Russian physician:—

"The dressing station was established at a convenient point somewhat sheltered from fire, though an occasional shell would fall near by, and the location was too exposed to allow wheeled transport to approach. The *personnel* consisted of three physicians, three sisters, a few 'feldschers' and some fifteen medical orderlies. An attempt was made to organize the station systematically and conduct it in an orderly way. At first but few wounded were present, and the required records were kept, but soon the battle became fiercer and fiercer, the maimed came in by scores and hundreds, and there was hardly time to render professional aid, leaving wholly out of consideration the keeping of records; so the wounded were bandaged as rapidly as possible and passed to the rear. There was much confusion and disorder, and presently the medical orderlies shirked, being worked out; but the surgeons and the sisters worked on for twenty-four hours continuously, until upwards of 2,000 cases passed through their hands."

Is this not strong evidence that in a severe battle the dressing stations will be overwhelmed, unless some means are taken to divert past them those who do not urgently need their services? The collecting station provides for this.

The collecting station *personnel*, aided by civil labour and such other assistance as it could get, would be busy preparing for the expected influx. Food and the means of cooking it would have to be got ready, shelter prepared, beds and bedding collected, arrangements for an abundant supply of water made, and for lighting, as the work would continue long into the darkness. The collecting station would further be the rallying point for all local transport found by the troops in the course of their advance, which would be directed to proceed there, and be parked in the vicinity in readiness for the evacuation of the field ambulances when the time came.

One other point. The administrative medical officer when fixing on his collecting station would inform the medical officer in charge of the clearing hospital, one march further back, of its location. The latter, if ordered, should be able to get up by the following evening, take over the collecting station, and so set free the field ambulance *personnel* to rejoin its own unit.

This is one conception of the collecting station, and I fancy you will agree that the *rôle* is a large and an important one. In a battle of encounter the execution would be more difficult, but the principle remains the same.

There is another subject to which I wish briefly to refer, and that is the changes which are soon likely to be imposed on us by the development of mechanical transport.

Those of you who were on manœuvres this year and saw the second division were able to appreciate what a division on the march is like. For miles behind the fighting troops the roads were occupied by a seemingly endless stream of vehicles, made up of ammunition, supply and transport columns and parks, and second line transport of all descriptions. I have been told by one who ought to know, that had the division been forced to retire, it would have required twenty-four hours to clear the roads before it could have moved. It is on this transport that we largely depend for clearing the field ambulances.

On the French manœuvres this year it was seen that a system had been evolved by means of which a vast proportion of this unwieldy transport could be dispensed with, and the roads behind the army kept clear.

The Government had subsidised motor manufacturers to make chassis according to a certain specification. The chassis is very like that of a motor bus. Commercial firms had been subsidised to use these chassis in their business in return for a lien on their

services for military purposes, much as we subsidise the omnibus companies for the occasional use of their horses. The Government themselves built bodies, suited for their own requirements, to fit these chassis, and stored them. When required for military purposes the chassis were called up and the military bodies fitted to them. The advanced base was thirty miles away from the fighting troops. In the afternoon the vehicles were loaded at the advanced base with what they had to carry. Mark, that they were not the heavy lorries or tractors familiar on our manœuvres, but quick travelling vehicles. If despatched at 6 p.m. they would be up with the troops before 9 p.m. Three hours would be required to unload and distribute, and in three or four hours more they would be home again and all the roads clear.

How does this affect us? It means that our field ambulances will be in the air, thirty miles away from their next relieving stage. Steps will, of course, be taken, when the change comes, to remodel our organisation. How this will be done it is much too early even to conjecture. I think we may take it that our field ambulances must retain some horse transport, as we must have transport which will go across country on occasions.

Whether the change will take the shape of (1) making some of the field ambulance transport mechanical and so giving this unit a wider range; or (2) giving special motor transport to the clearing hospital; or (3) having a special motor medical convoy unit to bridge the gap between field ambulances and advanced base; or (4) adapting the supply motors for medical uses on the return journey cannot at present be said. With some knowledge of devising motor sick transport the last-named method is to me very unpromising. The chassis may be good and the body may not be unsuitable, the great difficulty lies in so combining the two as to make reasonably good sick transport; special vehicles in our present state of knowledge seem a necessity.

The solution will be made known to us in due time; my only object now is to suggest that some change is not unlikely in the near future which may materially alter our present organisation. It is a trend of the times.

DISCUSSION.

Lieutenant-Colonel BURTCHAELL, R.A.M.C., said that he thought it was impossible to combine the duties of water men and first-aid; he also thought it impracticable to send men direct from the regiments to the collecting stations. In the Japanese army the slightly wounded went

first to the dressing station and were sorted there, those for the collecting stations being sent on to it; he thought it would be impossible for the administrative medical officer to explain personally the position of the collecting station to the regimental medical officers on account of the distances they were away from headquarters; this information must go into operation orders.

Lieutenant-Colonel WILSON asked what the relation of the collecting station was to the dressing station. He thought that it was a great mistake to have complicated arrangements, as they always break down in war.

Major WANHILL protested against the water-men being taken from their legitimate duties for first aid; they were already fully occupied with their water duties.

Colonel PETERKIN was doubtful if one slightly wounded collecting station was enough for a division on account of the length of front, and it must be remembered that a division went into action along several roads as a rule; he agreed on the necessity of developing regimental aid.

Surgeon-General EVATT pointed out that a continental regiment corresponded to our brigade, and suggested that it would be a good thing if we had a Brigade Senior Medical Officer corresponding to the continental regimental surgeon.

Lieutenant-Colonel BLENKINSOP thought that the regimental bearers should be provided with entrenching tools to enable them to improvise fire shelter for the wounded.

Lieutenant-Colonel ROWAN suggested a change of nomenclature to the name "slightly wounded station": he also thought that the water duties could be very well done by the regimental *personnel*.

Lieutenant-Colonel RUSSELL replied; he pointed out that at critical moments everything, even sanitation, must give way to the primary object of war, the defeat of the enemy. Water carts are second-line transport, and had no functions in battle; in regard to the collecting station for slightly wounded this would be 5 or 6 miles from the front, and could be formed out of a whole village, there would therefore be usually no necessity for duplicating it.

Surgeon-General BABTIE in summing up asked officers to devote special thought to the changes which would follow the more general use of mechanical transport in the field.

Clinical and other Notes.

MILK IN INDIA.

By Major R. J. BLACKHAM.
Royal Army Medical Corps.

The military sanitarian and analyst practising in India is constantly confronted with problems which are unknown to his colleagues in temperate latitudes. Not the least of these is a lack of reliable standards by which to compare the various food supplies so frequently submitted to him for expert opinion and advice.

One of the commonest of the Indian foods sent to divisional laboratories is milk.

During the past seven months I have examined 326 samples and have found that whereas the cows' milk was uniformly up to requirements not one of the samples of buffaloes' milk conformed to the standard given by most of the various authorities quoted in the attached Table 2.

Dr. Simpson states that the standard adopted for cows' milk in Calcutta is :—

Constituents	Cows' milk	Buffaloes' milk
Water	88·5	83·5
Total solids . ..	11·5	16 5
Non-fatty solids	8·5	10·5
Fat	3·0	6·7
Ash	0·7	0·7

Any cows' milk containing less than 11·5 total solids, 8·5 non-fatty solids and 3·0 milk fat was considered not to be genuine milk and the vendor was prosecuted.

This rule was in strict accordance with the Sale of Milk Regulations issued by the Board of Agriculture in 1901, which provide that fresh milk must contain not less than 3 per cent. of milk fat and 8·5 per cent. of milk solids other than fat.

Dr. Simpson gives it as his opinion that analyses establish the fact that the composition of cows' milk in Calcutta is the same as in England and that buffaloes' milk is twice as rich in fat and contains a larger amount of total solids than cows' milk.

In 1899 and 1900, Mr. Walter Leather made a number of analyses of milk of Indian cows and buffaloes in the Bombay Presidencies. His results differed from the Calcutta analyses only in the fact that the samples which he examined showed a uniformly higher specific gravity.

This is probably due, says Dr. Simpson, to the fact that Mr. Leather's analyses were all made in the cold and beginning of the hot season and not during the rains, when the milk is poorer. ("Principles of Hygiene as applied to Tropical and Sub-Tropical Climates," p. 182.)

From the results of my analyses it will be seen that the composition of the milk of cows in the sub-tropical Valley of Peshawar is very similar to that which obtains both in temperate climates and on the Delta of the Ganges.

Water is the chief adulterant of milk the world over, and experienced Indian analysts tell us that the extent varies from 20 to 60 per cent. in different parts of the country. In Bengal it is the recognised custom to dilute all milk with one-fourth of its bulk of water.

The samples which I have examined were, with thirteen exceptions, received from the military dairies at Peshawar and Cherat. My results are chiefly of interest with reference to buffaloes' milk.

Mr. Winter Blyth states that the milk of the buffalo (*Bos bubalus*) has been investigated somewhat minutely by A. Pappel and H. Droop Richmond (*Journal of the Chemical Society*, lvii., p. 752), but on the far-off Indian Frontier, I have not been able to turn up this reference. Mr. Blyth, however, quotes the results, and publishes them, together with those of Fleischman, the great German dairy expert, with which it will be seen they are in the sharpest contrast.

The figures given in Table II. are from the sixth edition of Mr. Blyth's valuable work, "Foods: Their Composition and Analysis," published in 1909. The other figures quoted are from the latest editions of Firth's "Theory and Practice of Hygiene," Parkes and Kenwood's "Hygiene," and Simpson's "Principles of Hygiene."

It will be seen from Table I. that the averages of 124 samples analysed in my laboratory between November, 1909, and June, 1910, were as follows:—

Specific gravity	Total solids	Fat	Solids, not fat
1,034·04 ..	15·98 ..	5·98 ..	10·0

In view of the uniformly low amounts of fat in the Peshawar buffalo milk, I communicated with the divisional farms officer and asked for reasons. He was unable to furnish me with any explanation, and suggested that it might be useful to ascertain the results obtained in military dairies in other parts of India. This has been done, and the results are shown in Tables III. and IV. It will be seen that the percentage of butter fat given by five out of six authorities in the standard analyses quoted in Table II., are not obtained in any Government dairy farm in India.

The procedure for the analysis of milk adopted in the laboratory of the first division is that taught in the Royal Army Medical College, and detailed in Firth's "Theory and Practice of Hygiene," p. 281, *et seq.*

The method used for determining the amount of fat is Leffman and Beam's centrifugal apparatus described in the *Analyst*, 1892, vol. xvii., pp. 83, 102, and 144. Colonel Firth says that "This method is subject to an error of ·1 per cent., but its rapidity and ease render it a valuable and reliable means of fat determination."

The method used in the Government dairies is Dr. Gerber's type of centrifugal apparatus driven by a strap.

I have compared the results with this apparatus with those obtained by the Leffman and Beam apparatus, and they agree fairly well.

The results of my investigations appear to establish the following facts:—

(1) The cows' milk supplied to the soldier by Government dairies in India is much above the standard laid down by the Sale of Food and Drugs Regulations of 1901.

(2) It will, moreover, compare favourably with the results obtained in English dairies.

(3) Buffalo milk obtained from Government dairies in India is, however, in its percentage of fat, much below the standards laid down by all the authorities consulted, with the exception of Richmond and Pappal, and at Peshawar the percentage of total solids has also been uniformly much below the amounts given in all but one of the analyses usually accepted as guides.

(4) The results of analyses of buffaloes' milk in various parts of India, as shown in Tables III. and IV., indicate that the amount of butter fat in buffalo milk is most in warm and moist climates such as Bengal, and least in hot or cold and dry climates such as Peshawar.

(5) The results obtained appear to indicate that no general standard can be fixed for the whole of India, and that the percentage of fat in buffalo milk given by most of the authorities hitherto accepted as standards requires reconsideration.

TABLE I.—ANALYSES OF MILK IN THE DIVISIONAL LABORATORY, FIRST PESHAWAR DIVISION. FROM NOVEMBER, 1909, TO JUNE, 1910.

Cows' Milk (Composition).

Month	Average	Number of analyses	Specific gravity	Total solids	Fat	Solids not fat
November	do.	14	1,033·57	13·09	3·85	9·24
December	do.	29	1,033·8	13·674	4·214	9·46
January	do.	27	1,032·8	13·7	4·5	9·2
February	do.	25	1,032·64	13·428	4·28	9·148
March	do.	25	1,033·64	14·412	4·552	9·86
April	do.	30	1,034·1	14·26	4·96	9·29
May	do.	23	1,030·1	12·33	3·67	8·66
June	do.	30	1,029·1	12·02	3·9	8·12
Average of 202 analyses ..			1,032·44	13·393	4·286	9·107

Buffaloes' Milk (Composition).

Month	Average	Number of analyses	Specific gravity	Total solids	Fat	Solids not fat
November	do.	5	1,034·4	14·5	4·8	9·7
December	do.	12	1,034·5	15·41	5·666	9·875
January	do.	28	1,034·9	15·8	5·75	10·05
February	do.	27	1,033·7	15·14	5·79	9·35
March	do.	23	1,035·8	16·38	6·15	10·23
April	do.	28	1,035·5	17·11	6·66	10·45
May	do.	1	1,034·0	15·8	4·5	11·3
Average of 124 analyses ..			1,034·04	15·98	5·98	10·0

TABLE II.—Standard Composition of Cow and Buffalo Milk, as stated by various Authorities.

Cows' milk	Firth's hygiene	Parkes' and Kenwood's hygiene	Stevenson and Simpson at Calcutta	Dutta and Chose at Calcutta	Cripper	Winter Blyth
Specific gravity ..	1032	1032·5	1032·6	Not stated	1029	1032
Total solids ..	12·83	12·5	14·67	12·84	13·8	12·8
Fat..	3·69	3·5	4·80	3·34	4·88	3·9
Solids-not-fat ..	9·14	9·0	9·87	9·5	8·92	8·9

Buffaloes' milk	Firth's hygiene	Richmond and Pappel	Stevenson and Simpson at Calcutta	Dutta and Chose at Calcutta	Cripper	Fleischman quoted in Blyth's food
Specific gravity ..	1032	Not stated	1033·3	1033	Not stated	Not stated
Total solids ..	18·60	15·86	18·88	18·7	17·38	17·07
Fat..	7·45	5·56	8·02	8·57	7·5	7·46
Solids-not-fat ..	11·15	10·30	10·86	10·13	9·88	9·53

TABLE III.—Showing the Average Monthly Percentage of Fat in Buffaloes' Milk Tested at Agra Military Dairy.

Month	Year	Morning	Evening
April	1909	7·22	6·92
May	1909	7·6	7·02
June	1909	7·92	7·48
July	1909	7·8	7·13
August	1909	7·8	7·1
September	1909	7·45	7·1
October	1909	7·2	7·0
November	1909	7·6	7·0
December	1909	7·2	7·0
January	1910	7·2	7·1
February	1910	7·3	7·1
March	1910	7·3	7·1

TABLE IV.—Showing the Average Percentage of Fat of Buffaloes' Milk at Various Military Dairies in India.

Serial No.	Name of Dairy	Fat per cent.
1	Lucknow	6·6
2	Cawnpore	7·8
3	Allahabad	7·31
4	Bangalore	6·8
5	Lahore Division	7·0
6	Belgaum	6·9
7	Poona-Kirkee	6·3
8	Rawalpindi	7·30
9	Sialkote	6·25
10	Jubbulpore	6·5
11	Mhow	6·57
12	Peshawar	5·98
13	Cherat	5·5
14	Rawalpindi (Contractor)	6·25

A MODIFIED EQUIPMENT FOR THE ROYAL ARMY MEDICAL CORPS.

By Captain K. H. Reed.
Royal Army Medical Corps.

Now that the clothing and marching equipment of the soldier are occupying so much attention among officers of the Corps and others, is it not time that some steps were taken to alter or do away with the very clumsy and unscientific marching order equipment worn by the men of the Royal Army Medical and other Corps? The disadvantage of the present method of strapping the great-coat and mess-tin to the back of the belt without any counter-weight or supporting straps has long been recognised. The belt must be worn very tight, and even then the unbalanced weight of the coat and mess-tin cause them to sag down behind and rest on the buttocks, where they jolt about at every step, the belt buckle also presses into the epigastrium, embarrassing respiration, unduly fatiguing the man, and causing him to adopt a slouching and bent-up method of progression, which seriously impairs his marching efficiency.

It would be better to adopt the new Mills-Burrows equipment in a modified form; but, if this is impossible, a very serviceable kit might be made from the old "bandolier" equipment by attaching the web great-coat slings directly to the belt, as shown in fig. 3, after taking off the ammunition pockets.

If the web great-coat slings were attached well towards the side, and the haversack and water-bottle attached directly to the belt by broad metal hooks, as used in the Austrian Army (in the brown-leather bandolier equipment), or by the patent fastenings in the case of the Mills-Burrows,

equipment their weight would help to counterbalance the great-coat, and the objectionable straps crossing the shoulders would be done away with.

I may say that I have recently modified a "bandolier" equipment as suggested, and the corporal on whom I tried it said it was far and away more comfortable than the present (Royal Army Medical Corps) equipment, which, he said, distressed the men very much on manœuvres.



FIG. 1.—Present equipment when well put on after a few miles march.

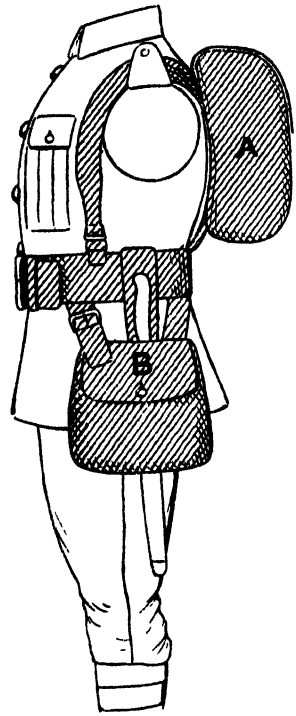


FIG. 2. — *Mills-Burrows Equipment* modified for R.A.M.C. with side-arm. A, Greatcoat and Mess Tin; B, Haversack and Water-bottle fastened directly to the belt, counteracting the weight of the valise.

There must be a good many brown-leather equipments in store, as they have recently been replaced among combatant units by the Mills-Burrows, and the cost of conversion as suggested would be only a few pence per kit.

I append three sketches: fig. 1 is of the present equipment after a short march; figs. 2 and 3 the Mills-Burrows and bandolier equipments respectively, both modified to suit the special requirements of the Royal Army Medical Corps.

As it might be necessary to retain the haversack and water-bottle slings for use when the rest of the equipment is not necessary, the water-bottle sling might be worn over the right shoulder (or the same side as the bottle) and the haversack sling shortened and folded round the haversack.

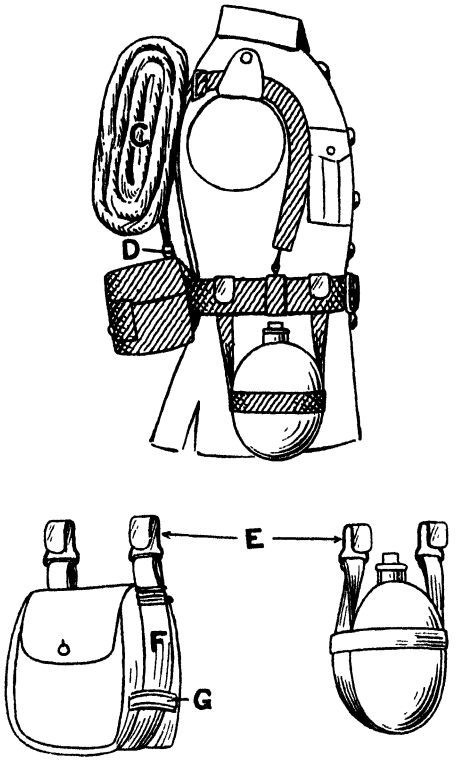


FIG. 3.—*Modified "Bandolier" Equipment.*

The water-bottle might be carried by putting the ordinary sling over the same shoulder, thus avoiding straps crossing chest; its weight should be on the belt to counteract the greatcoat.

C, Rolled Greatcoat in its slings; D, attachment to Mess Tin; E, showing method of carrying water-bottle and haversack by means of broad metal hooks attached to belt; F, sling shortened and reversed when not in use.

NOTES ON TWELVE CASES OF SYPHILIS TREATED WITH "606" IN THE MILITARY HOSPITAL, GLASGOW.

By Lieutenant-Colonel H. GORDON-HALL.
Royal Army Medical Corps.

Through the kindness of Dr. Ivy McKenzie, of the Western Asylums Research Institute, we have been able to treat the following cases with "606."

Case 1.—Indurated sore, palpable through prepuce, considerable discharge and fissures at muco-cutaneous junction. Slight roseolar rash, glands shotty, hair coming out.

Had previously had one injection of mercurial cream (1 grain Hg); given 0·4 gramme "606."

A week later, no rash, glands softer, discharge from under prepuce still continued. A fortnight later, circumcision was performed; six weeks later the patient was discharged from hospital. His discharge from hospital was delayed by the incision becoming infected.

Case 2.—Sores on penis, no definite induration. Mucous patches along both sides and in the centre of tongue; some pharyngitis; hair coming out. Both epitrochlear glands shotty; no glandular enlargement elsewhere; 0·4 gramme "606" with $\frac{1}{4}$ grain morphia; very little pain after injection. Local hydrogen peroxide dressings were applied to the sores on penis.

On the sixth day after injection, the mucous patches had almost gone, the pharyngitis was better, and the sores on the penis were healing.

On the tenth day there were no mucous patches nor pharyngitis. The epitrochlear glands were soft but palpable; the anterior sternomastoid glands on the right side were just palpable.

Discharged *on the eighteenth day*; no signs of disease present.

Case 3.—Generalised macular and roseolar rash, glands shotty, pharyngitis and mucous patches on both tonsils present; hair coming out.

Had previously received one mercurial injection ($1\frac{1}{2}$ grain). He was given 0·3 grammes "606."

Sixth Day.—Mucous patches gone, slight pharyngitis; rash just visible. No local treatment had been ordered for the mouth.

Discharged from hospital *on the thirteenth day.*

Case 4.—Had previously received four mercurial injections. There was still some pharyngitis with a mucous patch on the right tonsil. He was given 0·4 gramme "606."

Sixth Day.—Mucous patch gone; still some slight pharyngitis; hair coming out, and sternomastoid glands palpable on right side.

Discharged from hospital *on the sixteenth day.*

Case 5.—Hard sore on prepuce. Infected four weeks previously; no

other symptoms. Treated for two weeks with non-mercurial local antiseptics, under which the sore made no improvement.

He was given 0·4 gramme "606;" the sore rapidly improved, and was healed completely in eleven days.

Case 6.—Admitted to hospital in the interval after his third course of mercurial injections with a condition resembling a gumboil on left side. Tooth removed with great difficulty. Did not improve under local treatment; thin discharge persisting. On the left side of the lower jaw there was a hard swelling about the size of a pigeon's egg. Under treatment with potassium iodide, 20 grains three times a day, and ung. pot. iodide locally, the swelling improved very slowly.

After the injection of 0·424 gramme "606" the swelling disappeared almost entirely in nine days.

Case 7.—Generalised macular rash, glands shotty, hair coming out; some pharyngitis; mucous patch on the right tonsil. He was given 0·4 gramme "606" and ¼ grain morphine.

Fifth Day.—Mucous patch gone; slight pharyngitis; glands softer; rash rapidly going.

Thirteenth Day.—Discharged hospital. Only slight coppery staining in places.

Case 8.—Had previously received four mercurial injections. Slight pharyngitis, and hair coming out. He was given 0·4 gramme "606," and transferred to Edinburgh the same day. Has had no return of symptoms since (September).

Case 9.—An invalid. Case, probably, of commencing G. P. I. with optic atrophy. He was given 0·3 gramme "606" and ¼ grain morphine. Notes of his condition a fortnight later state he "is no worse."

Case 10.—Had syphilis in 1903; treated with mercurial injections. He had an attack of hemiplegia in 1904, affecting the face, arm, and leg on the right side, which passed off in one month under potassium iodide. Hemiplegia recurred again in 1910, and was practically cured in six weeks under rest and iodides.

He was given 0·3 gramme "606" with morphine ¼ grain. A fortnight later "never felt better." This dose, 0·3 gramme, will be repeated at a future date.

Case 11.—Finished first course of mercurial injections (9 grains). Coppery staining persisting. Very anæmic and despondent, suffering from headaches and loss of appetite. He was given 0·4 gramme "606."

A fortnight later, vastly improved. Looks better, eats well, sleeps well, states he has never felt fitter, and is putting on weight.

Case 12.—Some pharyngitis; several mucous patches had just disappeared; faint roseolar rash; glands, shotty; hair coming out. He had previously received two injections of mercurial cream (1½ grain each). He was given 0·4 gramme "606."

Ten days later there was no rash or pharyngitis. Three weeks later he was admitted to hospital, Ayr, with a large painful swelling at the site of injection—interscapular region, right side. There were no signs of suppuration.

He was discharged hospital after three weeks, his condition being much improved. After thirty-seven days he was readmitted to Maryhill from Ayr, suffering from "severe general conjunctivitis in both eyes with ciliary injection; some general irido-choroiditis."

The first cases which received injections suffered from very severe pain. We found that the injection of $\frac{1}{4}$ grain of morphia at the same time as the "606" injection, had a marked effect in minimising the pain. The patients were all injected in the right interscapular region, intramuscularly, and with strict antiseptic precautions.

It was found best to have the patient in bed for the injection, and to keep him there for at least twenty-four hours. The right arm should be kept in a sling, as movement seems to increase the pain afterwards.

Most of the cases lost weight after the injection. It was not uncommon for a man to lose 1 stone in a week. In nearly every case this weight was rapidly regained.

Only Case 1 had any marked rise of temperature following injection, the evening temperatures on the fourth and fifth days being 101° F. and 100·2° F. respectively.

In every case in which the hair was coming out, injection seemed to increase this condition for about a week; after this time the hair seemed to be shed less. In Case 4 this was especially marked.

Case 12 is the only one in which there have been sequelæ of any consequence. Whether or not the eye condition is due to "606" remains to be seen.

THE SEDIMENTING EFFECTS OF THE SERA OF HORSES AND SHEEP ON *BACILLUS TYPHOSUS* AND *BACILLUS COLI.*

By Major F. SMITH.
Royal Army Medical Corps.
Assisted by Assistant-Surgeon C. F. H. QUICK,
Indian Subordinate Medical Department.

In the Journal of the Royal Army Medical Corps for September, 1910, I gave the results of the examination of the sera of cows in India. It was shown that nearly all the adult cows, but not many calves, gave a positive reaction to *Bacillus typhosus*. Also that the cows' sera reacted to *B. coli*.

I have not been able to examine many horses, but of the twelve which I have tested, two gave the following positive reactions:—

	Dilutions of Serum.
No. 1 ..	1 in 10, +; 1 in 20, +; 1 in 40, ±; 1 in 80, −.
„ 2 ..	1 in 10, ±; 1 in 20, −; 1 in 40, −; 1 in 80. −.

The rest of the sera were negative. The examinations were made during the cold-weather season, 1909-10, in Rawal Pindi. All horses showed marked reactions with our stock *B. coli*, and two of them, the only two examined in this connection, gave a positive result with a coliform bacillus known in the laboratory as *B. collier*, a bacillus recovered from an anomalous case of fever. I am trying to arrange for the examination of a squadron of horses belonging to a cavalry unit of which the men have been for a long time suffering from typhoid fever.

I am indebted to Captain W. J. Dale, A.V.C., for the horse sera.

Forty-two sheep were examined at Murree, Punjab, during the summer of 1910, as to their serum reaction with *B. typhosus* in twenty-four-hour living broth-cultures. The macroscopic method was used in all, and in a few cases the results were confirmed by microscopic examination in a hanging drop. The positive reactions with sheep sera were less numerous than with cow sera. Only four showed anything in a dilution of 1 in 40, and that merely a trace. Two showed a complete reaction in a dilution of 1 in 20, and twelve a trace in this dilution. Twenty showed a complete reaction in a dilution of 1 in 10; four gave incomplete results. Roughly, 50 per cent. showed some reaction, and the rest were negative. All the sheep were adults.

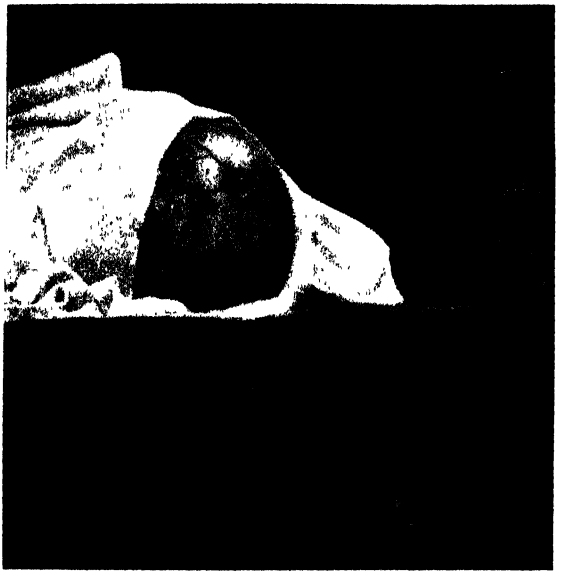
A CASE OF FRACTURE OF THE SKULL.

By Captain HUGH STEWART.
Royal Army Medical Corps.

The following notes are interesting and show the great amount of damage which can be done to the skull-cap by what at first sight appeared to be not a very severe injury. Boy F., aged 16, was brought in the afternoon to the station hospital, Upper Topa, in an unconscious condition with a small punctured wound over the left temporal region. The history of the injury, as far as known by his comrades, was as follows: The boy was playing in his tent after dinner and suddenly ran out and went towards a kind of trapeze which the boys had erected overhanging the khud. A few seconds afterwards they heard a dull thud coming from the direction of the trapeze, and on going over saw boy F. about 15 feet down the khud in a sitting position as if he had dropped straight off the trapeze; he was quite unconscious, and bleeding slightly from the wound on his temple. They brought him straight to hospital, where I saw him almost immediately.

He was quite unconscious, and did not respond to any external

stimulus, breathing very stertorously, and the left eye was completely closed and greatly discoloured. I found the following injuries: Small punctured wound over left temporal region, with a large hæmatoma over the whole of the left temporal region and extending some distance over the vault; several abrasions on the left side of the neck and a very small contusion on the shoulder. There were no other apparent injuries. I decided to send for Captain C. H. Turner, surgical specialist, 2nd (Rawal Pindi) Division, who arrived soon after 4 o'clock and decided to operate at once.



Showing the fractures of the skull cap and the trephine opening.

Operation.—A flap was turned down over left temporal region, and the following injuries were found: A stellate depressed fracture of the temporal bone and, corresponding to the punctured wound, a small hole from which brain-substance protruded; the fissure from the fracture radiated upwards towards the vertex, downwards towards the ear, forwards towards the orbit, and backwards to the occipital region, in each case extending beyond the area of the skull exposed by the incision. A trephine opening was made at the upper and back margin of the depressed area of about the size of a five-shilling piece; the depressed fragments were raised by an elevator and the loose portions removed. Hæmorrhage at this stage was very free; the anterior branch of the middle meningeal artery, being torn, was tied *in situ*. There was a small laceration in the dura mater and some subdural hæmorrhage. The brain substance was



To illustrate Case of "Osteoma Growing from the Upper End of the Humerus."
By Captain E. G. FRENCH.

found considerably pulped beneath the depressed portion of skull. A drainage tube was put in and the wound sutured.

The patient was put back to bed, the pulse being very weak. He did not improve in any way, and died without regaining consciousness about eight hours after the operation.

Post-mortem.—After reflecting the skin, &c., and exposing the skull-cap, the following injuries were seen: The left temporal bone was extensively fractured, and a large portion had been removed at the time of operation. The coronal suture was opened in its complete length. The right parietal bone had a long oblique fracture running backwards and outwards to almost the occipital ridge. In the frontal bone there was a long oblique fracture extending from the coronal suture on the left side to within 1 inch of the orbital crest.

On removing the skull-cap there was a large quantity of subdural hæmorrhage; the dura mater was lacerated, and there was considerable laceration of brain substance of Broca's convolution; the anterior branch of the middle meningeal artery was lower than normal and had been tied at the operation. There were no other injuries to any part of the body.

A CASE OF OSTEOMA GROWING FROM THE UPPER END OF THE HUMERUS.

By Captain E. G. FFRENCH.
Royal Army Medical Corps.

Private W. was transferred to the military hospital, Edinburgh, suffering from a large swelling on the upper and outer aspect of the left humerus. The patient stated that he had noticed a small swelling in that region about four months previously, which had been gradually growing. It did not give him any pain beyond slight discomfort while doing exercises in the gymnasium. On examination, the swelling was very hard and seemed to be growing from the bone. It was situated under the deltoid muscle, and pushed that muscle outwards. An X-ray photograph was taken of the shoulder and upper part of the arm, and it showed the growth to be of the nature of an osteoma. The patient was advised to have the tumour removed, and consented to the necessary operation. He was accordingly prepared for operation, and an incision about 4 inches in length was made longitudinally over the deltoid. The muscle was split and retracted to each side until the growth was reached. It was then found that it was growing from the outer side of the shaft of the humerus; the surface of the growth was quite smooth and not attached to the deltoid muscle. It proved to be an osteoma which had evidently been growing for some considerable time, much longer than the patient stated. It was removed by means of a hammer and chisel without much difficulty. Before operating we thought of the possibility

of the circumflex nerve being pulled down by the growth, and in consequence, in cutting down we proceeded cautiously; fortunately the nerve was not involved in the growth. The wound was closed, the muscle being stitched together and the skin sutured. It healed by primary union, and all movements of the arm are quite good. He has been discharged to duty. The X-ray photograph taken before the operation conveys a good idea of the case.

Report.

FINAL REPORT OF THE SUDAN SLEEPING-SICKNESS COMMISSION, 1908-1909.

By Captain R. G. ANDERSON.
Royal Army Medical Corps.

Introductory.—In this final report, owing to the absence of evidence of human trypanosomiasis in the Southern Sudan, and the consequent limitation of clinical and pathological investigations, I have of necessity confined my observations more particularly to the habits, distribution, &c., of "the fly," to which end as complete a chart as possible has been drawn up, showing the general distribution of both *G. morsitans* and *G. palpalis* throughout this region, compiled not only from the observations of past and the present Sudan Sleeping-sickness Commissions, but also from the accumulated evidence of numerous military and civil officials (Appendix I.).

Preventative and administrative measures have been fully dealt with in the Intermediate Report, and require but brief mention here. Some interesting notes and a map showing the areas of sleeping sickness and its surveillance in the Lado Enclave have been contributed by Dr. Paul Errera, its Principal Medical Officer (Appendix II.)

Pathological and Clinical Investigation.—The results gained in this direction have yielded but little worthy of record, since, having started on what was originally designed to be a year's investigation in the Southern Sudan, the early months of the dry season (December to May) were spent almost exclusively in covering as much ground, and getting as much routine examination, clearing work, &c., as possible accomplished before the rains became too heavy and the country impossible to traverse, and it was proposed that the remaining seven months of the rains should be devoted to microscopic work at Meridi. The second part of this programme was, however, abandoned, since it was agreed that insufficient opportunity for research existed to justify time thus being spent.

It will be sufficient, therefore, to record that routine examination of inhabitants was carried out for the detection of sleeping sickness along the entire route traversed—through the southern limits of the Bahr-el-Ghazal

from Shambe to the River Sueh—and along the Northern frontiers of the Lado Enclave, with especial reference to the Yei River and those places, Amadi, Dego, and Dai, referred to in the Intermediate Report as suspected centres of sleeping sickness—as also into the southern limits of Mongalla Province—without yielding a single positive result.

Cervical glandular enlargement was rarely found without obvious cause, such as syphilis, foul and parasitic conditions of the scalp, ulceration of the gums, mouths, &c. Gland puncture in five ambiguous cases which submitted to the operation gave negative results, as also the examination of fresh and stained blood-films, chiefly taken from the carriers around M'Volo and Meridi.

Enlargement of the inguinal glands was exceptionally common, more especially amongst the Gour tribes near M'Volo and Amadi, very often accompanied by lymphatic enlargement of the scrotum and penis, a modified form of elephantiasis due to filarial disease.

Varieties and Distribution of the Tsetse-fly.—As regards the actual study of the fly, of which only two varieties have so far been found in Sudanese territory—namely, the *G. palpalis* and *G. morsitans*—the general distribution of both will be best realised by referring to the chart accompanying this report (Appendix I.). From this it is evident that the distributions of *G. morsitans* and *G. palpalis* are closely associated (as one would expect among species of the same genus), and I believe that throughout the south-west Bahr-el-Ghazal, wherever suitable conditions occur, *G. morsitans* and *G. palpalis* will be found, and that the absence of one species in a country adapted to it is most probably associated with the absence of the other in any adjacent suitable area, as is seen in the Glossina-free north-east section of the province.

From this it seems likely that wherever *G. morsitans* is recorded along routes by "unqualified" observers, *G. palpalis* would on expert investigation be detected in adjacent suitable situations, such as shady rivers, khors, &c.

The abrupt disappearance of both species to the east of M'Volo and Amadi is evidence in favour of this supposition.

Migration of the Tsetse-fly.—From personal observation, and from the general consensus of opinion expressed by others, it is evident that *G. morsitans* changes its position almost continually, and does not haunt a definite locality as does the *G. palpalis*, whose range is limited to a progression along river or lake banks, chiefly dependent (as has been pointed out by Dr. Hodges) on movements of men and river traffic, almost negligible factors in the southern Bahr-el-Ghazal.

The migrations of the *G. morsitans* are to be accounted for by the fact of its following caravans, herds of big game, &c. This accounts for the almost unbroken incidence of tsetse-flies along any well-used road of the southern Bahr-el-Ghazal during the traffic season, whilst on native

paths and in trackless districts more definite and localised swarms are encountered.

These limited migrations are to be distinguished from the general encroachment which is taking place in the eastern district of the Bahr-el-Ghazal (for notes on which I am indebted to H. R. Headlam Bey). In 1906 the "fly belt" did not reach further north than within 8 miles of Darago, then the centre of an important cattle district, and it has since gradually extended 40 miles north of this place, and is now encroaching upon Rumbek, whilst the cattle-owning Dinkas and their herds steadily retire before it.

How far such advances and, possibly, retirements are taking place elsewhere in the province it is impossible to say. (Similar changes in the distribution of the tsetse-flies in the Zambesi Valley have been recorded by Austen.)

Food of the Tsetse-fly.—The difference in the distribution of these two species of Glossina also depends on the different sources from which they obtain the same food, vertebrate blood (Austen, &c.).

The more venturesome *G. morsitans* attacks his prey (herds of big game, caravans of man and beast, &c.) in the open, and only during the "cool of the day" (a period varying with the season).

The *G. palpalis*, on the other hand, can utilise this supply only when man and beast traverse its area (infrequently in these districts). It would seem to depend, therefore, for its food on the blood of small mammals, reptiles, and birds which congregate around shaded water. For this reason it is obvious that it extends its feeding time over a far longer period and has a more constant food supply than the *G. morsitans*, which is, in consequence, always more ravenous and persistent.

Big game only comes within the range of *G. palpalis* for short periods at watering time. Along the rivers of the southern Bahr-el-Ghazal not only man but crocodiles are scarce, and hippopotami, though numerous, are limited to schools, and from their exclusively aquatic habits during the day are not liable to be bitten. All the points are in favour of the "lesser life" on the dry foreshore at the waterside being the staple diet of *G. palpalis*.

I imagine, too, that numerous herds of apes and monkeys which inhabit and "nest" in the large trees at the water's edge play a part in the dietary of this species, which is of interest when one considers that cases naturally infected by *T. gambiensis* have been recorded amongst these animals.

Habits of the G. morsitans.—The *G. morsitans* is a fly of such cosmopolitan habits that it appears to be almost independent of surroundings. It has neither local ties to place nor strict limitation of migration, promiscuously following any herd or caravan in the search for food.

Habits of the G. palpalis.—The *G. palpalis* is essentially conservative, and its distribution, though general throughout the southern Bahr-el-Ghazal, is strictly limited by certain conditions.

In these regions its "sphere" is very limited, and dependent on humidity. The fly is, in fact, "localised" during the summer—in the highest sense of the word. Then its area seems restricted almost to the actual river or lake bed itself—in which at this season the water has been reduced to a minimum and the amount of shaded foreshore greatly increased.

As regards essential surroundings, these are "more or less open water with contiguous and especially overhanging shade, preferably of scrub, and a certain amount of fairly well defined bank or shore" (Dr. Hodges).

I found the medium shade afforded by larger bush and smaller tree most infested, especially when tangled with vines and creepers, or when the foliage on opposite banks met overhead. The shade of large trees was less infected, though Captain Ensor lays stress on such cover as essential.

A certain amount of open "wing space" appears necessary, as also a diffusion of light yielding what might be termed a "broken shade."

It has been remarked by many that in deep absolute shade, and on dull, sunless days, *G. palpalis* is not in evidence; hence the close confined foliage of papyrus, swamp grass, &c., is found untenanted. Here, too, the lack of "wing space," "footing," and food in the shape of vertebrate life, are deterrent factors. Large overhung rocks, running and falling waters, and broken and intersected streams are certainly positive factors in influencing the presence of *G. palpalis*.

Collections of fallen leaves and vegetable mould, too, appear favourable, possibly as breeding, and certainly as settling grounds (*vide* Ensor's Report).

Destructive Influence of Grass and Forest Fires.—The periodical grass and forest fires, though undoubtedly possessing a marked deterrent effect on the exposed *G. morsitans*, can, I consider (contrary to the opinion of Captain Ensor and others), have little influence on the *G. palpalis* or its pupæ, which latter are deposited as a rule within 10 yards of the water's edge (Bagshawe), since the actual belt of green vegetation along the water margin (for a breadth of from 10 to 20 yards) is seldom affected by the flames, and here attains a tropical and perennial luxuriance.

These conditions are those which usually obtain in Uganda (Bagshawe), and they would only seem, in the destruction of surrounding vegetation, to impose a further "localising" influence on the *G. palpalis*, in marked contrast to its "scattered" distribution described in the humid forests of the Gold Coast and Dahomey.

Destruction of Glossinæ.—In negativing the destructive effects of fire on the *G. palpalis*, one must seek some other factor which certainly does keep this species in numerical inferiority to the ever more exposed *G. morsitans*. This I imagine to be the numerous insectivorous birds, fish, reptiles, and mammals (particularly bats) invariably congregated round open water.

Fly Range.—The "natural" range of *G. palpalis* in the Bahr-el-Ghazal is very limited, being influenced chiefly by the lack of humidity during the summer, for which reason, too, the "following range" is seldom more that 50 yards, though in the deep shades of M'Volo it was increased to 200 to 300 yards.

During the wet season probably these "localised" tsetse-flies become far more scattered. As regards the "along shore" range, placed at a mile or more in Uganda, I imagine it is, in the little inhabited Bahr-el-Ghazal, very restricted.

Only along the Yei River, indeed, were there any considerable habitations or river-road traffic, associated with a fishing industry, which would influence this "range."

Clearing of Roads and Watering Places.—As regards the more local measures, the general clearance and safeguarding of all *G. palpalis* infested riverain roads throughout every infested district in the province has been recognised as essential.

So far the only road dealt with has been that between M'Volo and Meridi, 107 miles along the Naam River, and including in its clearance both those stations and twelve intermediate riverside rest-houses.

Removal of Stations.—As regards the segregating of stations, I am convinced that should sleeping sickness once actually make its appearance in the Bahr-el-Ghazal, prompt and radical measures for safeguarding some of them will be imperative, owing to their dangerous positions. Indeed, the rendering of these posts safe by clearance seems impossible. On the approach of sleeping sickness, therefore, they should be unhesitatingly removed to some suitable "fly-free" site. The same remark, according to Captain Ensor, applies to Yambio.

Ganzie, or New Meridi, open and well situated, has already been rendered safe.

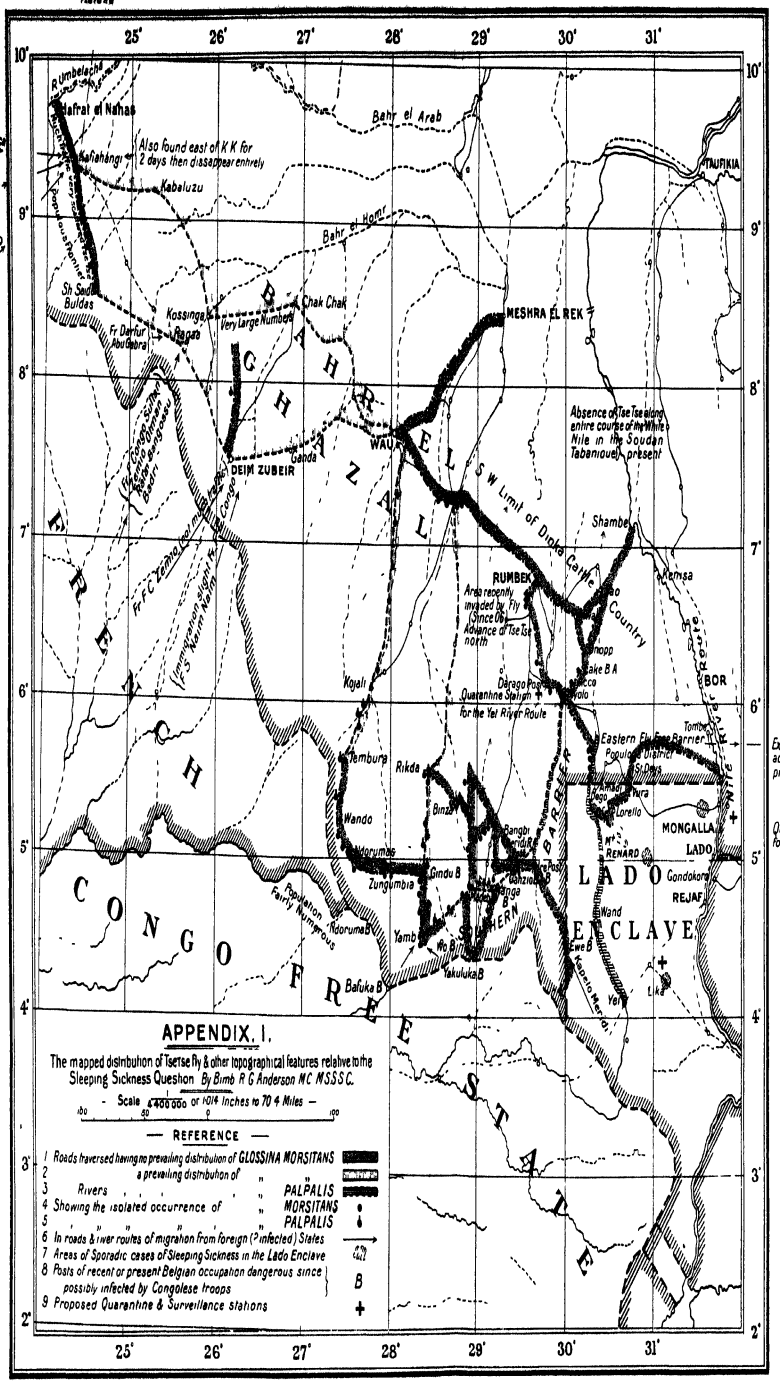
Native Habitations.—In but few places visited are the native habitations actually on the water's edge, and so in the advent of sleeping sickness but little removal of huts would be necessary.

The Yei River is the exception. Here the clustered villages would afford an excellent nidus for endemic sleeping sickness in the Bahr-el-Ghazal, as I suspect they have already done within the Lado interior.

Animal Trypanosomiasis.—As to the prevention of infection among transport animals, there is little to say.

During five months tour in the southern Sudan, with a hamla of thirteen donkeys, I administered small doses of arsenic (arsenious acid), with encouraging results.

Native Knowledge of the Fly and Disease.—Though a point of minor importance, it is yet of interest to note that in no place visited in the southern Bahr-el-Ghazal, Mongalla, and the northern Lado Enclave was there any knowledge of a difference or any distinction drawn by the native between the two varieties of tsetse-fly; nor had the people or their



APPENDIX. I.

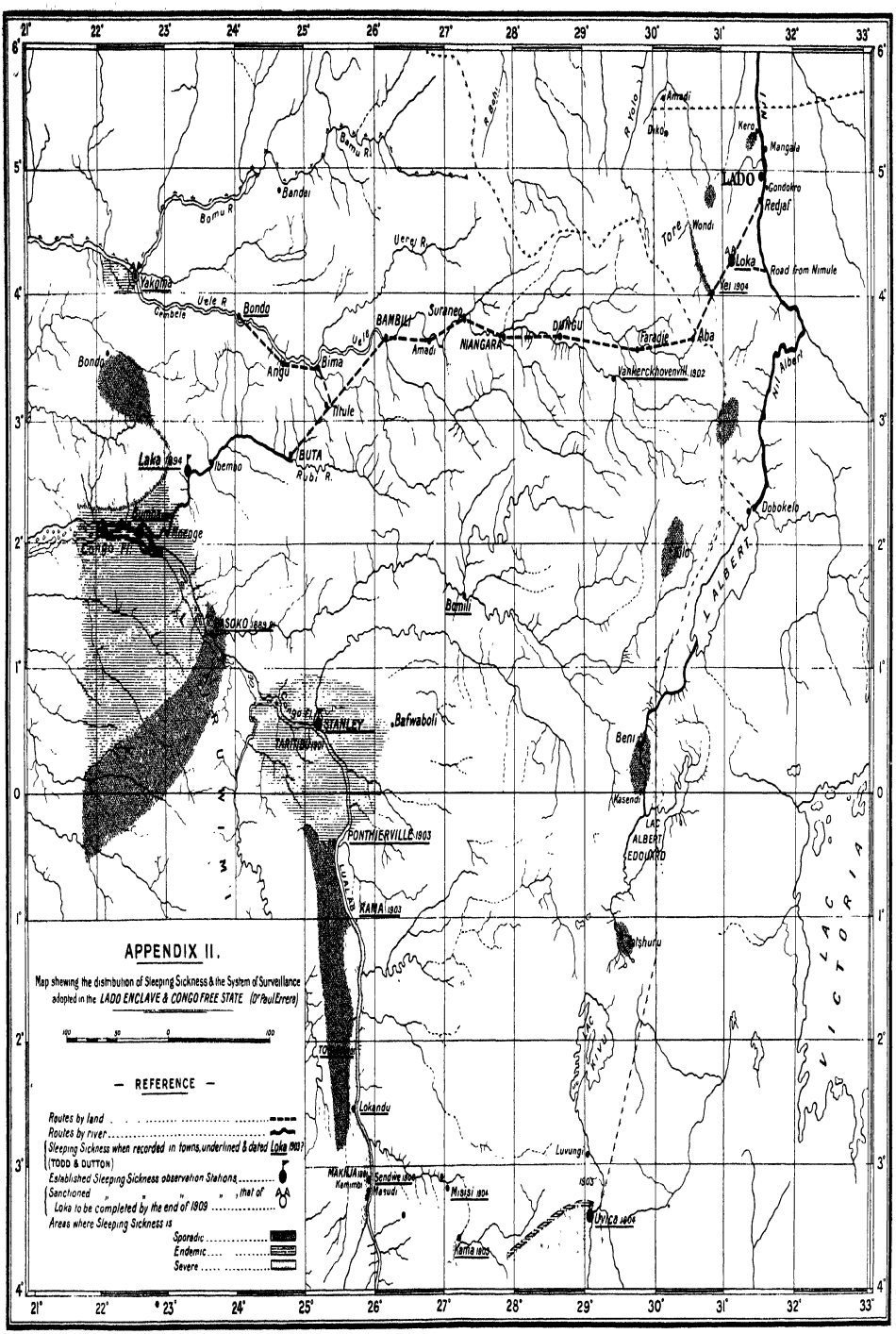
The mapped distribution of Tsetse fly & other topographical features relative to the Sleeping Sickness Question By Bimb R G Anderson MC MSSSC.

Scale 1/400 000 or 1014 Inches to 70.4 Miles

100 50 0 100

— REFERENCE —

1. Roads traversed having no prevailing distribution of GLOSSINA MORSITANS
2. " a prevailing distribution of " "
3. Rivers " " " PALPALIS
4. Showing the isolated occurrence of " MORSITANS
5. " " " " " PALPALIS
6. In roads & river routes of migration from foreign (? infected) States
7. Areas of Sporadic cases of Sleeping Sickness in the Lado Enclave
8. Posts of recent or present Belgian occupation dangerous since possibly infected by Congolese troops
9. Proposed Quarantine & Surveillance stations


APPENDIX II.
Map shewing the distribution of Sleeping Sickness & the System of Surveillance adopted in the LADO ENCLAVE & CONGO FREE STATE (Dr Paul Errera)
— REFERENCE —
Routes by land
Routes by river
Sleeping Sickness when recorded in towns, underlined & dated Loka 1903
(TODD & DUTTON)
Established Sleeping Sickness observation Stations
Sanctioned " " " " that of Loka to be completed by the end of 1909
Areas where Sleeping Sickness is
Sporadic
Endemic
Severe
LADO
Loka
Yei 1904
Road from Nimule
Yakoma
Bondo
Bambili
Suraneo
NIANGARA
DUNGU
Aba
Yankerckhoven 1902
Paradis
Amadi
Bima
Angu
Titule
BUTA
Ibemba
Laka 1904
Bafwaboli
STANLEY
Beni
Kasindi
LAC ALBERT EDOUARD
PONTHIERVILLE 1903
KANA 1903
Lokandu
Kamimbi
Sandwe 1904
Misisi 1904
Uvira 1904
Kama 1905
Luvungi
Walshuru
Dobokelo
Nimule
Amadi
Mangala
Kero
Diko
Gondokoro
Redjaf
Wondi
Tore
Bomu R.
Uele R.
Aruwimi R.
Ituri R.
Semliki R.
Albert N.
Albert L.
Victoria L.
Kivu L.
Tanganyika L.
Congo R.
Lualaba R.
Kasai R.
Kwango R.
Kamtsha R.
Kwilu R.
Loange R.
Lukenie R.
Sankuru R.
Lomami R.
Luvua R.
Luapula R.
Kamalondo L.
Mweru L.
Bangweolo L.
Moero L.
Tanganyika L.
Kivu L.
Albert L.
Albert N.
Victoria L.
Kwango R.
Kasai R.
Lomami R.
Luvua R.
Luapula R.
Kamalondo L.
Mweru L.
Bangweolo L.
Moero L.
Tanganyika L.
Kivu L.
Albert L.
Albert N.
Victoria L.

sheikhs and sultans ever heard of sleeping sickness, nor did they suspect any ill to human beings from the bite of the tsetse-flies.

Seldom, indeed, outside the actual Dinka and Atwot cattle country was there even knowledge of the tsetse-flies' influence on cattle disease.

APPENDIX I.

The Mapped Distribution of Tsetse-fly and other Topographical Features, &c., Relative to the Sleeping-sickness Question in the Southern Sudan.

In compiling the accompanying map of the southern Sudan, it has been my object to record therein all the information obtainable as regards the distribution of tsetse-flies (*G. palpalis* and *G. morsitans*) throughout this entire country, the numerical, &c., conditions of the population, the position of "barriers," and the main roads of inter-communication between the southern Sudan and adjacent foreign states, as probable channels for the introduction of sleeping sickness; in this light those routes indicated between the French Congo and the western Bahr-el-Ghazal (for knowledge of which I am indebted to C. Percival Bey) would seem to be of great importance, since from recent information I gather that the French Congo is a much more imminent danger than has hitherto been suspected. Of it R. V. Savile Bey, in the 1908 Annual Report, says: "Sr. Sobolevski, who accompanied Prince Paul Demidoff on a sporting tour into the French Congo to the west of Deim Zubeir, reports a great deal of the disease (sleeping sickness) there, at Djemeh and even further north, so that the menace of invasion seems to be considerably extended on that side."

The actual distribution of the fly (in appreciable numbers) will be seen to be limited almost entirely to the south-west segment of the Bahr-el-Ghazal itself. The number of roads marked as infested by *G. morsitans* would indicate a very large preponderance of this species, which is, however, misleading (*vide* text), since *G. palpalis* has only, so far, been detected by a very limited number of "expert" observers, whilst every "lay" official is familiar with the *G. morsitans*, whose presence has therefore been far more frequently reported. This bears on the opinion expressed as to the closely related distribution of each species.

I have embodied in this map not only the evidence of Captain Ensor's careful and extended researches of last year and the findings of the present Commission, but also the gist of notes afforded by many officials of the province and others, to whom my sincere thanks are due.

APPENDIX II.

The Distribution of the Tsetse-flies and Sleeping Sickness in the Lado Enclave and the System of Surveillance Adopted by the Belgian Authorities in the Lado and Congo.

I am indebted to the courtesy of Dr. Paul Errera, Principal Medical Officer of the Lado Enclave, for the following notes, with an accompanying

map, to which I have added a few further details taken from the charts of Drs. Dutton and Todd, illustrating the advance of sleeping sickness in the Congo Free State ("Reports of the Expedition to the Congo," 1903-5). From this map may be gathered the gravity of the present situation in the Congo and Lado.

EXTRACT FROM NOTES ON TRYPANOSOMIASIS IN THE LADO ENCLAVE BY DR. PAUL ERRERA

G. palpalis is found in great numbers along the banks of the Yei River. It is common in the north of the Enclave, but exceptional in other parts.

Sleeping sickness is not endemic, though sporadic cases have occurred in villages close to the Yei River, near Tore, and to the south-west of Kiro.

During the last year five cases arose among the soldiers and workmen at Yei and one case at Lado.

Since 1907 the Uele district and Enclave (so far relatively free from infection) have been safeguarded from the possible importation of fresh cases by a special sanitary station at Ibemba. Here all travellers from the Congo are submitted to examination, and should trypanosomiasis be diagnosed they are detained and admitted into a special hospital.

Doubtful cases are also detained pending a definite diagnosis, whilst healthy travellers are only passed (after examination) on a doctor's certificate, which has to be produced for inspection *en route*.

As there is a possibility of the introduction of sleeping sickness from the east, the Government have recently *sanctioned a second sanitary station* to be established (at Loka), where the two trade routes from Lado and Nimule meet. The hospital in connection with this station will also gather the sporadic cases throughout the Enclave. *A third sanitary station* will protect Uele from the north-west, being situate near Yakoma on the Ubangi River.

(There are two other sanitary stations for the protection of the southern Congo rather than the Enclave and Sudan—namely, Stanleyville and Uvira, not mentioned in these notes.)

Dr. Errera does not think it likely that sleeping sickness will spread into the Sudan from the east across the Nile, since there is little traffic and but few *G. palpalis* in this district. He considers that interchange of infection between the Enclave and the Bahr-el-Ghazal is more likely to occur across the northern frontier of the Enclave (*i.e.*, along the Yei River route referred to as the chief source of the danger in this region, vide Intermediate Report.)

From these notes of Dr. Errera's on a subject about which, in the Lado Enclave, but little has so far been made known, it will be seen what a menace the infected Lado Enclave is to the Bahr-el-Ghazal, and how important is the policing of the main routes of inter-communication (the Nile and Yei). As also the very serious situation which will arise

on the reversion of this state as part of Sudanese territory, points which have already been dealt with in the Intermediate Report.

It is a satisfaction to know that active steps are being taken to limit the spread of the disease from the Congo towards the Lado and the Sudan.

Travel.

NOTES ON NORTH CHINA.

By Captain E. J. ELLIOT.
Royal Army Medical Corps.

The following notes on the conditions of service and climate in North China may prove of interest, and perhaps assist officers who may in future be ordered there:—

The North China Command, which by sea is the most remote station in which we serve, can yet be reached by the Trans-Siberian Railway in fourteen days at a cost of about £50. The command consists of two stations, Tientsin and Peking. The former is situated on the Pei-Ho, and is reached in about six hours by steamer from the mouth of the river; the latter, Peking, is reached by a four hours' railway journey from Tientsin.

Climate.—One must be prepared for extremes of heat and cold. In winter the thermometer may fall to several degrees below zero, and in summer at times reaches 107° to 108° in the shade, and even higher. The climate is very dry all the year round, except in the rainy season, which lasts for about four to six weeks in July and August. There are various very agreeable seaside resorts to which married families and others can go in summer, and thus avoid the heat in the towns. In the winter the river is closed to traffic, being frozen over for about three months. The one unpleasant feature of the climate is the frequency of dust-storms, which prevail during the winter and spring.

Clothing.—For the winter enough service dress should be brought to last the "tour," and a thick, well-lined, long British warm coat. Fur caps are worn, and can be best purchased locally. All the home uniform is used, except the blue helmet. For mufti a warm overcoat is necessary. Fur collars and cuffs are largely worn on the British warm coat and in mufti. Furs can be bought cheaply in the native city. A good supply of warm underclothing, shirts, flannels, &c., should be brought, as these are expensive in the shops —a dollar (value 1s. 9d.) only buying approximately what a shilling purchases at home.

For the summer khaki drill is worn, and can be bought at a low cost from the Indian tailors. A white helmet and white mess-kit should be brought. White drill uniform is not necessary. Similarly a good supply of summer underclothing should be brought out.

It is advisable to bring a good supply of mufti clothing, especially for winter wear. In summer thin Chefoo silk suits are largely worn, and it is best to buy those made locally.

Living.—Food is very cheap on the whole. The cooking is done entirely by the Chinese, who are excellent cooks.

At present Royal Army Medical Corps officers are on the lodging list, and have to find houses. These are difficult to get as a rule, and rents are high, but it is possible sometimes to get small houses or flats, furnished or unfurnished, at a moderate rent even for married people. It is advisable on arrival to stay for a short time in a hotel. There are two leading hotels in Tientsin, which are large and comfortable, but rather expensive.

Rents for unfurnished houses run about 90 to 100 dollars per month. Many people furnish their houses from the numerous auctions held all the year round, at which furniture can be bought very cheaply.

Sports.—There is a good 18-hole golf course close to Tientsin; also a recreation ground where football, hockey, cricket, &c., can be played. For about three months in winter there is excellent ice skating, both on local ponds and on a skating rink erected in the town. Skates can be bought locally, but it is best to bring a pair. There is no roller skating. In summer there is plenty of tennis and polo. Paper hunts and cross-country runs, &c., on ponies are organised in the winter. There is a race club which holds two meetings in the year.

Chinese ponies can be purchased for anything from 50 dollars upwards, and can be used for hacking, or trained for polo or racing. They average about 13·1 hands. If keen on riding, it is advisable to bring out a good saddle. There is excellent shooting; snipe, duck, teal, &c., can be got in the immediate vicinity of Tientsin and also a short distance away by rail. Larger game, such as wild boar, deer, and even tiger, can be got by taking a trip into the interior. Cartridges are expensive in Tientsin.

There is a rowing club on the banks of the Pei-Ho. Subscriptions to the different clubs are not high.

A bicycle will be found extremely useful for going about the concessions, visiting patients, &c., and is a great saving in rickshaw fares.

It is best to bring out all gear connected with games, such as golf, cricket, &c.

Pay and Allowances.—The various allowances, including lodging allowance, come to approximately 170 dollars per month for a captain. There is a distinct advantage to be gained in drawing pay locally, as the pay is in dollars at a Government rate, which is often lower than the local rate, and consequently money can be transmitted home with advantage. Pay can also be sent home as gold by the Command Paymaster if the rate of exchange is high. The dollar varies slightly in value daily; its present average value is 1s. 8½d. to 1s. 9d.

Leave.—Full leave can generally be got each year, or it can be allowed to accumulate. There is quite a varied selection of ways in which it can be spent—*e.g.*, in Japan, five days by steamer from Tientsin; in Korea, three days by rail from Tientsin; in Shanghai and up the Yangtze river, reached in a few days by rail or steamer; and in numerous other places which are of fairly easy access.

Amusements.—For the socially inclined there are numerous dances, both public and private, and the residents are very hospitable. There is a good Amateur Dramatic Society.

Almost all the European nationalities are met with, each having its own concession in the town; and there are facilities for the study of languages.

Tientsin is well supplied with good European shops where almost every necessary can be obtained, but the prices are high and the articles often of inferior quality to those got at home.

Letters arrive in sixteen days from London if marked "*via* Siberia."

Peking differs from Tientsin in some respects. Accommodation is limited, as all the Guard must live inside the British Legation, and there are only quarters for single officers.

The climatic conditions are the same as in Tientsin.

There are only a few European shops of any size. There is a good club, the subscription to which includes most of the sports. These are much the same as in Tientsin. There is, however, very little golf played, as the course is difficult of access.

Otherwise the same remarks apply as for Tientsin

Reviews.

SURGICAL ANATOMY. By John A. C. Macewen, B.Sc., M.B., C.M. F.F.P.S.G., &c., &c. London: Baillière, Tindall and Cox, 1910. Pp. xiv and 478; 61 illustrations. Price 7s. 6d. net.

It would seem, judging from the number of works on surgical anatomy which have appeared recently, that almost every young surgeon feels it necessary to produce one. The present volume has many good points; it is well planned and clearly written, sufficient detail is given, and the pitfall of including too much operative surgery is avoided; in fact, as far as general plan and scope are concerned, it is one of the best works of its kind that we have met with.

Unfortunately the execution of the work is by no means in keeping with its design. The author expresses a hope that his work will obviate frequent reference to systematic text-books of anatomy, and to succeed in this aim a work of this kind must be, before all else, accurate. We regret to find that this book swarms with mistakes; not merely printers' errors, though these are present in such numbers as to show great want of care in revising the proofs, but errors of fact, errors in description, and even grammatical blunders, all of which confirm the impression that the book gives of hasty and careless production. To give a few instances; nerves are repeatedly said to "enervate" muscles, Ludwig's angina is said to be an affection of the submaxillary lymphatic glands, the internal maxillary artery is stated to take part in the collateral circulation after ligature of the subclavian, the left cornu of the hyoid is said to be on the left of the innominate artery, and ligature of the innominate artery is mentioned as a possible treatment of innominate aneurysm. The spinal cord is said to lie free within its sheath, no mention being made of the ligamentum denticulatum, the plural of viscus is given as "visci," the external oblique is said to "arise" from Poupart's ligament, and the neck of an inguinal hernia is said to lie inside the spine of the pubes. Median lithotomy is called "Cock's operation," and hallux valgus is described as an outward subluxation of the joint between the internal cuneiform and the first metatarsal.

It would be easy to give many more instances, but even a few such gross blunders render a book of this kind useless to the practitioner and positively misleading to the student. Thorough revision is the only remedy, and in another edition all these mistakes could be removed and the book rendered useful and trustworthy. The illustrations are mostly good, though the photographs of sections of the head are too small to be of much use.

C. G. S.

A CONSIDERATION OF THE INTRODUCTION OF SURGICAL ANÆSTHESIA. By William H. Welch, M.D., LL.D., Professor of Pathology, Johns Hopkins University, Baltimore.

In this interesting and eloquent address, delivered at the Massachusetts General Hospital on the sixty-second anniversary of "Ether Day," a very good account is given of the early attempts to abolish pain during operations, and the conflicting claims to priority in accomplishing this end are fairly and judicially summed up. The fact that anæsthesia, in

common with all other great advances in the healing art, is due to experimental research is rightly laid stress upon. C. G. S.

THE SEXUAL DISABILITIES OF MAN. London: A. K. Lewis, 1910. Second Edition. Pp. 204. Price 5s. net.

In this small book of 200 pages Mr. Arthur Cooper treats of sterility arising from defect on the man's part, a subject of some obscurity, and one which receives, as Mr. Cooper remarks, but scanty recognition in the medical schools of this country. The work is based upon an experience of thirty years and upon the teaching of the late Professor Ultzmann, of Vienna. The introduction emphasizes the difference between copulative power and procreative power, and insists upon the large proportion of barren marriages due to the latter cause in the husband.

The first 80 pages deal with the subject of sterility and its treatment, and give a full account of the nature of the seminal fluid and the changes, qualitative and quantitative, which may occur in it as the result of disease or injury. The last 120 pages deal with impotence. This is described as sometimes secondary to some definite preceding morbid condition, and sometimes primary when no such condition can be discovered. An account of the morbid conditions leading to impotence are given, both physical and psychical, and the book ends with a couple of chapters on treatment, general and local. Mr. Cooper has treated an obscure and difficult subject in a straightforward and scientific manner, and has, moreover, shown (to recall the quotation from Montaigne, which graces the first page) that it is possible to write of the "action genitale aux hommes, sans vergogne." E. M. P.

INTESTINAL SURGERY. By L. A. Bidwell, F.R.C.S. London: Baillière, Tindall and Cox, 1910. Pp. xiv. and 215; 120 illustrations. Price 6s. net.

There must be a large number of medical officers of the Army and Navy who are familiar with Mr. Bidwell's teaching and practice at the West London Hospital. The first edition of this admirable work on the technique of intestinal surgery was the outcome of Mr. Bidwell's classes in intestinal surgery. The present one brings the subject up to date, and a great deal of additional matter has been introduced, together with a number of new and remarkably clear illustrations. The author insists upon the great usefulness of practising intestinal suture upon fresh bullock's intestine, and has furnished an illustration of a holder which is used for that purpose at his classes. The first chapter contains anatomical and general considerations regarding intestinal anastomosis, with the material required, and the various forms of suture, interrupted and continuous. Then follow two chapters on lateral and end-to-end anastomosis. Mr. Bidwell recommends the latter for surgeons whose intestinal work is small, and questions the value of any apparatus in intestinal anastomosis. Special operations on the stomach and intestines, large and small, are considered in the next two chapters. The author's experience makes him recommend jejunostomy instead of gastrostomy, the method employed being entero-anastomosis between afferent and efferent limbs of a loop of jejunum near its commencement, and the attachment of the apex of the loop to an opening in the abdominal wall. Colotomy is shown to have only a limited application in the present day, being

practically reserved for cases of pelvic growth or intractable pelvic obstruction. The operation of choice is ileosigmoidostomy. The next chapter deals with appendicitis, and is one of the best and most lucid in the book. It lays down clear and concise directions for dealing with the various conditions which may present themselves. The various methods of opening and closing the abdomen, the preparation before, and the treatment after laparotomy form the subject matter of the last three chapters, which are full of useful and practical details. In fact, the leading feature of the whole work is its eminently practical character, and it should be in the hands of every young surgeon who wishes to successfully overcome the initial difficulties of abdominal surgery.

E. M. P.

A Study in Troop Leading and Sanitary Service in War. By Major John F. Morrison, General Staff, U.S. Army, Senior Instructor, Department of Military Art, and Assistant Commandant, Army Service Schools; and Major Edward L. Munson, Medical Corps, U.S. Army, Senior Instructor Department Care of Troops, Army Service Schools. Approved by the Surgeon-General U.S. Army. Published by Authority of the War Department. Ketchison Printing Company. Price $1·25.

This small but extremely handy book aims at giving a clear and complete picture of the working of the medical department of a United States field force, before, during, and after an engagement. Since it is the only original work in the English language dealing with this subject, it should be extremely valuable not only to officers of the Army, to whose work it directly relates, but also to members of our own Service, both Regular and Territorial.

The account given is extremely vivid and realistic. It is told in narrative form, and begins by furnishing a nominal roll of the medical officers, both on the staff and in charge of units, including those on the lines of communication, whose work it is intended to follow. Tables follow giving the strength of medical *personnel* of all ranks in a division, with the number of horses, riding and draught, allowed both for officers and men. It would be a distinct advantage if a table showing the strength of all units in a division had been given. These are available in the official Hand-book of the American Army, but for ready reference their inclusion here in tabular form would be of great value. The fighting strength of an American division appears to be slightly greater than ours, 19,000 as against 17,000, including in these numbers, of course, only Infantry, Cavalry, Artillery and Engineers.

The distribution of medical officers is on a distinctly more liberal scale than is the case with us. Thus for 14,800 infantry (using round numbers) organised in 27 battalions, the Americans provide 36 medical officers, as compared with our 12 with a force of 12,400 officers and men. In the Artillery they have 6 officers to 12 batteries (2,272 men). Whereas we have 4 to the same number of batteries (3,673 men). The total number of medical officers available for duty with combatant units is 49 against our 18. This, of course, follows more closely the Continental custom. Behind these come 4 ambulance companies (21 officers) and 4 field hospitals (21 officers), as against the 27 medical officers in our 3 field ambulances. In addition, 2 evacuation hospitals, each of 324 beds,

appear to be mobilised for the division, whose duties seem to correspond to those of our clearing hospital of 200 beds.

The book is divided into five parts. The first part is short and deals only with the general situation assumed to exist the evening before the expected engagement. The second parts gives "the special tactical situation for the first division existing up to daylight, September 16th, and the preliminary medical arrangements, and measures of the medical department depending thereon." In this part are detailed the arrangements for camping out the different portions of the division which is distributed in and around Leavenworth. A conference is held between the chief surgeon of the division, and the chief surgeon of the lines of communication, to arrange for the establishment of one or more of the two evacuation hospitals available in some of the large hotels available in Leavenworth. Then the chief surgeon is summoned to divisional headquarters to receive information as to the tactical situation and the proper arrangements for the anticipated engagement.

In the third part the tactical movements of the division are given from daybreak till the capture of the enemy's position about 1 p.m. The division is broken up into two columns, one of which consists of one Brigade of Infantry (9 battalions) with one regiment of Field Artillery (6 batteries), and the other of 2 brigades, and the remaining regiment of Field Artillery. The movements of the right column are given in detail, the movements of a particular battalion, detailed to form the advanced guard, being studied minutely with the necessary medical arrangements. Orders are not merely indicated but given in the proper form, which helps to make the narrative more real, and certainly much more instructive. A similar course is pursued with regard to the movements of the 2nd Brigade, and finally the work of the Regimental Medical Service during the actual progress of the assault on the enemy's position is described. Too much is not attempted. The fortunes of a single regiment are followed, and the work of the medical establishment described. A similar course is adopted as regards the movement and work of the ambulance companies. In the fourth part we are given the leading of the first division subsequent to its capture of the enemy's position, and during pursuit, with the work of the ambulance company dressing stations and the installation of the field hospitals. Preliminary arrangements for the sanitation of the battlefield and the evacuation of the wounded are described. The fifth and last part of the work is concerned with the final removal of wounded, the burial of the dead, and the other sequelæ of a battle.

The whole book is written in the clearest possible style, and the exact *rôle* of the medical department as an efficient tactical factor is clearly recognised. One of the *dramatis personæ* is a Lieutenant Green, of the Medical Corps, lately commissioned, and use is made of his inexperience to emphasise the mistakes that a young officer, or one belonging to a Volunteer or Territorial organisation, and unused to the realities of medical work in the field, might be expected to fall into. This alone should make the book of great value for Territorial officers. The book is, of course, primarily intended for the use of medical officers of the United States army, but contains information that should be useful to all army medical officers. The mere fact that it deals with a different organisation to our own adds to its value, since the mental exercise of solving the same

problems by means of the *personnel* laid down in our war establishments, and with our equipment is a very instructive method of study. This book can be strongly recommended to all medical officers, not "for the purpose of examinations," but for that of self-education. The only suggestion that occurs as appropriate is that the map at the end should be of some rather stouter material, and placed loose in a pocket. At present it is not easy to refer to the map unless one has the book on a table, which in certain moods is occasionally irksome. C. H. M.

A Practical Guide to the Newer Remedies. By J. M. Fortescue Brickdale. Bristol: J. Wright and Sons, Ltd. Price 5s. net.

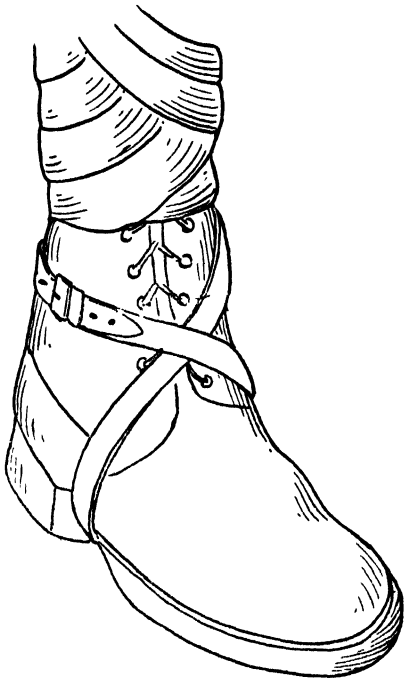
This book deals chiefly with the composition and therapeutic uses of the various synthetic remedies which have appeared within recent years. Information on these substances is scattered through many journals, chemist's year-books, &c., so that a book like this which brings them all together should be found very useful. The first two chapters deal with iodine and with preparations of arsenic; then come chapters on drugs acting on the intestines, on the circulation, hypnotic drugs, anæsthetic drugs, antipyretic drugs, and, lastly, a chapter on certain specific remedies for phthisis, for acute rheumatism, for whooping-cough, for gonorrhœa, and for functional nervous disorders. The only criticism which we have to offer is that the index might be amplified so as to include references to the various diseases in which the drugs have been used. W. S. H.

Current Literature.

A Marching Strap for Blistered Feet.—*Archives de Médecine et de Pharmacie Militaires*, October, 1910. By M. J. Coindreau, Méd. Major de 2nd Cl., au 99e d'infant. The author begins by repeating the well-worn (and little listened to) tale of the effect that sore feet play in lessening the efficiency of infantry. After pointing out that simple remedies are often the most efficacious, he relates a method recommended to Captain Fallois, of the 99th Infantry, by a leather merchant near Rouen, who had himself found it very useful, which consists in applying a simple strap passed as a figure of eight around the instep.

Description.—The straps, specially prepared as marching straps, are of very good leather, strong and supple, about 3 mm. thick, 15 mm. broad, and 80 cm. long; at one end is a strong buckle, and at the other, on a space of about 20 cm., a dozen holes are pierced. Being strong and supple the straps allow restricted movement, the resistance they oppose being firm yet elastic. The strap is passed round the foot and ankle in a figure of eight (see illustration). It must be sufficiently tight to give support without causing constriction, the buckle being on the outside, to avoid risk of "brushing," and in front of the external malleolus. The reader is warned that the straps should only be worn with boots having eyelets like the ankle boots of the regular army. A subaltern who tried wearing them with boots which had hooks suffered considerably from the pressure on these. Captain Fallois experimented with some men who volunteered for the purpose. Amongst these was a reservist who, two days previously, had fallen out, complaining of a strained and swollen

ankle. On the next day the regiment had to perform a forced march of 35 kilometres (21¾ miles), at a pace of 3 miles an hour. The footsore men, including the reservists, wore these experimental straps, and were able to accomplish this march without further trouble. They remained in the ranks for the subsequent marches, and in a very short time were able to give up the strap. In spite of this continuous marching the abrasions healed over. As a result of this experiment, Dr. Coindreau set to work on the same lines, and furnishes the following summary of his observations. The strap has been worn by fifteen men suffering from sore feet, among them being a reservist showing œdema of the right foot



MARCHING STRAP FOR BLISTERED FEET.

the result of a strain (a case closely parallel, apparently, to the one noted above). This man was sufficiently relieved at the end of four days to do away with the strap, the boots adapting themselves to the feet; whilst the others found their abrasions healed in from three to five days. In spite of the fact that the marches were fairly long (20 kilometres on an average — 12½ miles), all these men were able to continue marching. Though they continued to wear the same boots they found that the abrasions quickly dried up and healed.

The author considers that in view of the seat, nature and extent of these lesions, there is little doubt that few of these men would ever have

completed the march without the straps. Some would have had to be carried, others sent back.

Other men realising the benefit conferred by the strap, made use of a strap from their knapsacks, and it would appear that a strap of any kind serves the same purpose, though there is reason to remark that the strap used in these last-mentioned cases was larger, tougher, and less elastic, and perhaps tended to be irksome. Major Coindreau, whilst admitting that the strap reduces the number of points of contact of the foot with the boot, and thus by limiting rubbing facilitates marching, suggests that perhaps, whilst averting certain injuries it may induce other lesions elsewhere, as *e.g.*, over the tendo Achillis. As a matter of fact, the men who tried it appear to have been unanimous in its praises, both as a palliative and a preventive measure. Wishing to learn more accurately the utility or otherwise of this method, Dr. Coindreau experimented on himself, and found that an irritated area on the heel causing smarting and pain on marching, ceased to cause inconvenience. He concludes that the results obtained from wearing the straps seem to be attributable to various causes. The more or less complete fixation of the foot in the boot does away with, or at the very least in large measure diminishes, the to-and-fro movements which cause the abrasions. So as to be easily slipped on and tolerated, boots should be appreciably larger than the feet, and it is necessary that the feet should not be subjected to too great constriction.

Some means are therefore necessary to neutralize the slipping and rubbing movements which are the real causes of the abrasions, and which last are more frequent and numerous in proportion to the amplitude of such movements. The function of the strap is to prevent these movements, and also to guard against the discomforts of too large, defective, or badly fitting boots. Dr. Coindreau states that most of the footsore men, after using the straps for three or four days, were able to carry on and continue marching with the same boots without suffering. The strap acts like a well-applied plaster of Paris bandage, and if worn for several days, modifies the conformation and shape of the foot. At the same time it fixes the tarsal part of the foot in a suitable position. The boot, in course of time, keeps this new position, and as a result there is no more excoriation. The author also draws attention to the rapidity with which all abrasions have been cured, though they were deep and extensive. Although the footsore men have taken part in the long daily marches, very few days elapse, reckoning from the date of application of the strap, before the abrasions themselves dry up, and heal with a rapidity greater than could have occurred had the men been at rest. At first sight, he points out, this seems to be an anomaly, of which he offers the following ingenious and scientific explanation: Marching having been rendered possible, acts by quickening the circulation, and thus maintains a congested state of the foot, which is more favourable to tissue repair, which is accelerated. The action of the strap can thus be likened to the elastic band of Bier's treatment.

Cost and Durability.—The actual cost price is 25 centimes, and it does not seem that expense need be a bar to their employment. The life of the straps seems considerable. After eleven days' use on manœuvres, and during long hours of daily marching, the experimental straps only showed slight traces of wear, none were cut.

Dr. Coindreau proposes to continue these observations, which must strike all medical officers as being of enormous practical value.

N. D. W.

Bacteriology of Commercially Pasteurised and Raw Market Milk.—Reprinted from the United States Department of Agriculture. The following summary and conclusions give *a resumé* of the work carried out by S. H. Ayers, and W. T. Johnson, jun. The results in this paper hold only for commercially pasteurised milk. By commercial pasteurisation is meant milk heated from 60° C. (140° F.) to 65·6° C. (150° F.) in the "holder" process, or up to 71·1° C. (160° F.) in the "flash" process. At the present time the tendency is to use low temperatures with the "holder" process, and in commercial work it is doubtful if temperatures will ever be used universally in either process higher than those above mentioned. When higher temperatures are used the cream line is liable to be destroyed, a cooked taste may be produced, which injures the sale of the milk, and the cost of pasteurisation is increased by the use of more steam. It is not reasonable, therefore, to expect the use of high temperatures in commercial pasteurisation. Arbitrary limits could be set, as 60° C. (140° F.) to 62·8° C. (145° F.), and even perhaps to 65·6° C. (150° F.) for the "holder" process, and 71·1° C. (160° F.) for the "flash" process, at which temperatures milk, when heated under commercial conditions, may be expected eventually to sour, and the bacterial content will be comparable to the average group curves for pasteurised milk as shown in this paper. If higher temperatures are used, a degree of heat may be reached which will result in the destruction of all but spores, which, when allowed to develop, will undoubtedly produce peptonisation of the milk. Granting that 60° C. (140° F.) for twenty minutes is sufficient to destroy pathogenic organisms, it is believed it would nevertheless be advisable in commercial work to use a temperature a little higher, as 62·8° C. (145° F.), and for thirty minutes. That temperature would be sufficiently high to afford protection against pathogenic bacteria, and yet would probably leave in the milk the maximum proportion of lactic-acid bacteria, and the group proportions would be very similar to those of all grades of market milk.

Conclusions.—(1) Commercially pasteurised milk always sours, because of the development of lactic acid bacteria, which, on account of their high thermal death-point survive pasteurisation, and perhaps in some cases because of subsequent infection with acid-forming bacteria during cooling and bottling.

The acid development in an efficiently pasteurised milk is about the same as that in a clean raw milk. But sometimes a strong, old taste develops, which is probably due to the development of alkali or inert bacteria. The old taste, however, is not characteristic of pasteurised milk, for it may be noticed as well in clean raw milk, when held under similar conditions. The less efficient the pasteurising process, the more closely does the acid increase of the heated milk approach that of a dirty raw milk.

(2) The relative proportion of the groups of peptonising lactic acid and alkali, or inert bacteria, is approximately the same in efficiently pasteurised milk as it is in clean raw milk. In both cases the alkali or inert forms constitute the largest group, the lactic acid bacteria next, while the peptonisers are in the minority. When both of these milks—the efficiently

pasteurised and clean raw milk—are held, the group relations change; but if the changes taking place are compared, it will be found that they are the same in each. At the time of souring, the group proportions have changed so that the lactic acid bacteria constitute the largest group with the alkali or inert forms next in order, and the peptonisers in the smallest proportion as initially. In both of these milks the group of peptonisers may increase slightly in its proportion to the other two groups during the first two days, but it then gradually decreases and always forms the smallest group.

When milk is less efficiently pasteurised the position of the groups may be reversed so that the lactic acid bacteria constitute the largest group, with the alkali or inert forms next in order, but here again the peptonisers form the smallest proportion of the total bacteria. This group arrangement is the same in a dirty raw milk.

The more efficient the pasteurisation, the smaller the percentage of lactic acid bacteria; and similarly, the cleaner the raw milk, the smaller the percentage of lactic acid bacteria.

(3) The peptonising bacteria are present in smaller numbers in the inferior grades of commercially pasteurised milk during the first twenty-four hours after receiving than in raw milk of the same quality, and the peptonisers may increase to slightly higher numbers in the pasteurised milk when held several days than in the raw milk of high initial lactic acid bacteria content; but it should be remembered in this connection that milk is usually consumed within twenty-four hours of delivery. The number of peptonisers in a good grade commercial pasteurised milk on the initial count and on succeeding days is approximately the same as in a clean raw milk when held under similar temperature conditions.

(4) Lactic acid bacteria of high thermal death-point are found in milk and may be easily isolated by special methods of procedure. From these experiments it was found that when milk is heated for thirty minutes at 60° C. (140° F.) and plated, the percentage of acid-forming organisms that resisted the heating ranged from 0·001 to 18·91, the average being 4·8 per cent. of the total acid colonies. When heated at 65·6° C. (150° F.), the range is from 0·001 to 3·13 per cent., the average being 0·74 per cent. of the total bacteria. It must be remembered that these figures are based upon acid colonies, and these are not necessarily all true lactic acid bacteria.

The thermal death-point of one lactic acid organism which was isolated from milk is 74·4° C. (166° F.) in broth and 75·6° C. (168° F.) in milk when heated in Sternberg bulbs for thirty minutes. When heated for ten minutes in milk the thermal death-point is 77·8° C. (172° F.).

These heat-resisting lactic acid bacteria play an important part in pasteurised milk and undoubtedly account to a large extent for its ultimate souring.

(5) All milk, whether pasteurised or raw, must necessarily be infected during cooling and bottling by bacteria in the receiving tanks, in the pipes, or the cooler, and in the bottles; but the low bacterial counts obtained from pasteurised milk in these investigations show that the reinfection must have been very small.

(6) It is manifestly unfair to conclude that bacteria increase faster in pasteurised than in raw milk, simply from a comparison of the ratios of bacterial increase. If a pasteurised milk with a low initial count is

compared with a raw milk of high bacterial content then the ratios of increase may show that the bacteria in the heated milk do increase faster; but if the same pasteurised milk is compared with a clean raw milk with a low count, then the ratios of increase will be found to be approximately the same. From the results of this investigation it is evident that bacterial increase in an efficiently pasteurised and a clean raw milk is about the same when the samples of milk are held under similar temperature conditions. This question of the relative growth of bacteria in raw and pasteurised milk can be properly settled only by a long series of comparisons of samples of milk with approximately the same bacterial count and similar bacterial group percentages.

(7) The "holder" process of pasteurisation is superior to the "flash" process. With the "holder" process a high efficiency may be obtained with a low temperature, while to obtain the same efficiency with the "flash" process a high temperature would be required. A temperature of 62·8° C. (145° F.) for thirty minutes seems best adapted for efficient pasteurisation.

(8) Considering the low counts of bottled commercially pasteurised milk and the similarity of the bacterial group proportions to those of clean raw milk, the former cannot be classed from a bacteriological point of view as inferior to commercial raw milk. Pasteurised and raw milk should, however, always be bottled and should not be allowed to be sold as "loose" milk from stores.

(9) Pasteurisation should always be under the control of competent men who understand the scientific side of the problem. It is believed that ignorance of fundamental bacteriological facts often accounts for inefficient results rather than a wilful lack of care on the part of the dairyman.

German Army War Ration.—The following has been taken from the new German Army Regulations for feeding the troops in war (Kriegs-Verpflegungsvorschrift).

First Section, para. 1, defines the persons who are entitled to free rations on mobilisation—viz., all officers and men in addition to a large number of officials and civilian workmen employed by the Army.

Para. 2.—The field ration consists of: A daily bread ration and a daily meat and grocery ration.

Para. 3 (1).—The bread ration consists of: 750 grammes (26 ounces nearly) bread; or 400 grammes (14 ounces nearly) egg biscuit; or 500 grammes (18 ounces nearly) field biscuit. Should the full meat ration not be procurable the General Officer Commanding may order an increase of the bread ration to 1,000 grammes (2·2 lbs.), or if there is difficulty in obtaining the full bread ration the General Officer Commanding may reduce this to 500 grammes (18 ounces) and increase the meat ration to 500 grammes (18 ounces), or make a corresponding increase in the preserved meat ration.

When the troops do their own baking, 540 grammes (19 ounces) of flour and 6 grammes ($\frac{1}{5}$ ounce) salt are to be issued for every 750 grammes of bread to be baked.

Para. 4.—Meat and grocery ration (Beköstigungsportion).

(1) The daily ration shall be: (*a*) meat 375 grammes (13$\frac{1}{2}$ ounces) of

fresh, salted, or frozen meat; or 200 grammes (7 ounces) of smoked meat, bacon, or sausage; or, 200 grammes (7 ounces) of preserved meat.

(*b*) Vegetables, 125 grammes (5 ounces) rice, groats, barley, wheat, or oatmeal; or 250 grammes (9 ounces) pulse, peas, lentils, beans; or 60 grammes (2 ounces) of dried vegetables; or 150 grammes (5⅓ ounces) preserved vegetables (French beans, or meat and vegetables of pulse variety); or 1,500 grammes (3 lbs. 5 ounces) potatoes; or half the allowance of vegetables plus half the quantity (750 grammes) of potatoes; or two-thirds vegetables and one-third potatoes.

Under certain circumstances the following are permitted as substitutes for vegetables: 200 grammes (7 ounces) nudeln (a kind of macaroni); or 1,200 grammes (2 lbs. 7 ounces) of carrots, turnips, fresh beans; or 1,200 grammes (2 lbs. 7 ounces) of any kind of cabbage; or 450 grammes (15 ounces) sauerkraut; or 125 grammes (5 ounces) of stewing fruit.

These are not intended to replace the whole of the above vegetable ration; half this quantity should be issued with half the potato ration.

(*c*) Salt, 25 grammes.

(*d*) Coffee, 25 grammes of roasted coffee or 30 grammes of green coffee or 3 grammes of tea with 17 grammes of sugar.

When great exertions have to be made the Commander-in-Chief can authorise an increase of the above ration by one-third, provided the quantity is obtainable.

(3) In bad weather the coffee ration may be doubled by order of the (Armee-Oberkommando) Commander-in-Chief, or he may order an issue of 3 ounces of spirits, or of a double-tea ration.

(4) In the enemy's country requisitioned supplies, or supplies purchased with requisitioned money, shall be issued in accordance with the above scale.

Para. 5.—The feeding of the troops may be carried out in one of three ways.

Para. 6.—(*a*) Quartierverpflegung, *i.e.*, food must be provided according to the above scale by the householder on whom the man is billeted. This is apparently the plan contemplated in an enemy's country (p. 11, para. 1; p. 12, para. 2).

Para. 7 (*b*).—Magazinverpflegung. Food is issued to the troops. The supplies may be taken from stores carried with the army or obtained by requisition on inhabitants or authorities. Usually purchases will be made through the local authorities at prices fixed by the Commander-in-Chief (Armee-Oberkommando). When paying for supplies in an enemy's country arrangements will be made to provide the necessary cash by forced contributions.

Para 7 (*c*).—In the enemy's country the requisitioning of supplies, in addition to billeting with board, affords the simplest solution of subsisting the army on the country. Supplies may be requisitioned in the immediate neighbourhood by troops themselves, for their own use, or through the district authorities. Every commander is entitled to demand the supplies he may be in need of at the moment. Receipts are to be given for all articles taken.

Para. 8.—Money allowance for the purchase of food.

(2) Money raised in the enemy's country may be issued to the troops according to a fixed scale, for the purpose of buying their own food.

(4) The daily allowance in money is paid at:—

	With bread		Without bread	
(*a*) Full day's food ..	1·40M.	1s. 5d. ..	1·25M.	1s. 3d.
(*b*) Midday meal ..	·65	8d. ..	·60	7½d.
(*c*) Evening ,, ..	·50	6d. ..	·45	5½d.
(*d*) Morning ,, ..	·25	3d. ..	20	2½d.

Para. 12.—On any railway journey of at least four hours an allowance of 6d. is given in addition to the ration, for the purchase of refreshments.

Para. 12.—Iron ration.

With the exception of the cavalry every man will have three full iron rations. Where wheeled kitchens are provided the third iron ration is carried in the field kitchen.

Cavalry carry two full iron rations, and a third iron ration of meat and preserved vegetables.

(2) The iron ration consists of 250 grammes (9 ounces) egg biscuit or field biscuit, 200 grammes (7 ounces) preserved meat, 150 grammes (5¼ ounces) preserved vegetables or vegetable and meat, 25 grammes roasted coffee, 25 grammes salt. Bacon or smoked meat may be used instead of preserved meat, and rice or groats in place of biscuit.

Para. 13.—An advance of 1,000 M. (£50) is permitted to a regiment on marching off, to provide a canteen wagon, if their canteen funds are not sufficient for the purpose.

A list of articles to be stocked in the canteen is given.

The first appendix contains instructions for the baking of bread in the field, the second deals with field cookery and the others with requisitions and receipts. C. E. P.

Wounds by Hand Grenades.—The following notes are taken from an article prepared by Oberstabsarzt Blau, from Russian reports, and published in the *Deut. Milit. Zeitschrift* of February 5th, 1910.

The character of the wound inflicted varied greatly in different cases. In many it resembled a large superficial burn, the surface being stained yellow. In others all the soft parts of a whole limb were torn off, leaving the bones exposed. Some men had an enormous number of small lacerated superficial wounds covering, say, the whole surface of the back. Sometimes a small wound of entry was found leading into a long and tortuous canal with a splinter or stone lodged at the extremity. Almost all the wounds became septic. Some of the wounded died within twenty-four hours from acute septicæmia, in other cases there was grave nervous disturbance shown by confusion of thought, low muttering and muscular tremors, but without actual delirium; others, again, lingered on for months, becoming gradually weaker from chronic poisoning. Only a few of the deeper wounds by hand grenades were seen in hospital, but no information is available as to the number killed by these weapons.

C. E. P.

Motor Cars in Military Ambulance Work.—The following note is taken from the *Militärische Presse und Vedette* of January 5th, 1910. At Budapest, during the spring of 1909, when mobilisation was in full swing, the members of the Hungarian Automobile Club suggested the formation of a motor transport company for wounded. Negotiations were at once begun with the Hungarian Red Cross Society and resulted in the formation of the "Budapest Automobile Sick Transport Column of the Red Cross Society." The statutes of this branch were finally approved by the Red Cross Society on November 29th, 1909.

The following are the most important articles :—

The column is formed for the special purpose of conveying sick and wounded from the railway and steamer stations to the hospitals. The *personnel* consists of a commandant, deputy commandant and twenty members. The commandant is appointed by the president of the Red Cross Society, and has the status of a delegate of the Red Cross Society.

The conditions of membership are : (1) That the motorist must not be liable for any other duties in war ; (2) he must furnish a motor car which is not required for any duty in war ; (3) he must sign an undertaking to serve in the column for two years.

No service is required in peace time, but the commandant has the right to order an annual parade of all cars, which must be produced in a condition fit for the transport of wounded. The President of the Automobile Club and a delegate of the Red Cross Society are to be present at this inspection.

The commandant will detail the members for duty and must himself comply with any instructions received from the Commandant of Budapest.

The column commandant will wear the uniform of a delegate of the Red Cross Society, the deputy commandant a red cross brassard with gold piping, and the members a plain red cross brassard. The motor cars must be maintained in perfect working condition and be arranged for the carriage of lying-down cases. While employed for transporting sick the motor cars are to carry white panels with a red cross on both sides and on the front of the car. C. E. P.

Recent Changes in the Medical Organization of the Japanese Army.—*Hospital Orderlies.*—During the year 1909 the formation of a corps of hospital orderlies for ward duties was begun in the Japanese army ; formerly there were a certain number of hospital orderlies attached to regiments for duty while the ward orderlies' work in garrison hospitals was performed by civilians. The term of compulsory service in the corps is to be two years. The men enlist as ordinary privates in combatant units ; on completing four months' training those intended for the corps of hospital orderlies are selected by the company officers and sent to garrison hospitals for a course of six months' theoretical and practical instruction, and two months' work in the wards. At the end of this time they must pass an examination and receive a certificate as special, 1st, 2nd, or 3rd class hospital orderly according to their abilities. The best men are kept in the hospitals for duty. If they elect to continue serving after their two years is finished they may qualify for the rank of serjeant, serjeant-major, or special serjeant-major. The special serjeant-major is responsible for clerical work, the others may specialise in one of the departments, *e.g.*, X-rays, pharmacy, surgery, or medicine, and are placed in subordinate charge of the division. A special class of orderly drawn from one of the metal-worker crafts is placed in charge of instruments. The orderlies' course of instruction is similar to our own.

Method of Dealing with "Typhoid Carriers" amongst Newly Joined Recruits.—Medical officers make careful inquiries from each recruit as to whether he or any of his family have suffered from enteric fever, or whether it is prevalent in the district from which he comes. In any suspicious cases a specimen of urine and fæces is sent to the garrison hospital for bacteriological examination. Similarly if enteric fever occurs

in barracks, all troops are examined in this way. Any carriers detected are isolated in the garrison hospital, and an examination made once a week. As a rule no treatment is given, but in obstinate cases, 1½ grammes urotropine are administered daily. It is stated that the bacillus has not been found to persist in any man for more than ten weeks. When no bacilli are present the man is returned to barracks even if a positive Widal reaction is obtained. Endo's medium is used for culture tests.

Medical Officers and Apothecaries.—Medical officers and apothecaries may graduate in a university or extra-mural school; the former are preferred, and are gazetted lieutenants immediately on joining; the graduates from extra-mural schools have to serve for two years as second lieutenants. An extra-mural man can graduate at 24 years of age, whereas the university man is usually 27 on graduation. The entrance is by competitive examination, but there are not often more candidates than the number of vacancies. On joining, medical officers and apothecaries are "on probation" and rank as first class serjeants of the medical corps. They serve three months in a regiment, receiving instruction in company drill and musketry, then three months in the wards of a military hospital studying military surgery, medicine, hygiene, and hospital administration. After passing an examination in these subjects they are gazetted lieutenant or second lieutenant. There are no subsequent examinations for promotion. There is an Army Medical College at Tokio, where regimental medical officers are sent for specialist work or revision courses lasting from six months to two years.

Specialism.—Officers who wish to go in for specialist work, and have shown ability or special aptitude for any branch of the profession, are given facilities for special study, the usual period being two years. There is no extra pay attached to the specialist appointments. The special subjects are medicine, epidemic diseases, bacteriology, operative surgery, diseases of the eye, ear, throat and nose, and training of hospital orderlies. C. E. P.

Removal of Plaster of Paris Bandages.—At the December meeting of the Gesellschaft für physikalische Medizin, Dr. Max Stransky demonstrated an easy method of removing plaster of Paris bandages which have been applied as splints to a broken limb. He marks out the line along which it is intended to cut open the splint, and thoroughly moistens this part of the bandage with vinegar. After one or two minutes the splint becomes quite soft, and can be cut open with an ordinary pocket knife. Dr. Stransky states that he has used this method for twenty years, and that it has saved his patients from the discomfort caused by the use of plaster shears; these are, moreover, expensive and always more or less unsatisfactory. (*Wiener med. Wochenschr.*, February 26th, 1910.) C. E. P.

Action of Petroleum on Rats.—The following note appeared in the Tropical Hygiene portion of *Le Caducée* of February 5th, 1910. On board a ship in the Tropics, the waste water from an ice machine formed a pool in the hold. This was oiled to keep off mosquitoes. The ship had previously been infested with rats, these disappeared entirely after the application of petroleum to the water in the hold. It has been noticed that ships engaged in carrying petroleum never harbour rats.

C. E. P.

Correspondence.

FIELD AMBULANCE.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—Both at manœuvres and in schemes for staff tours, when an Advance Guard is detached from a force which has a field ambulance, the question arises as to what detachment of the field ambulance should go with it.

At manœuvres last year the daily advance guard of the column I was with consisted of two companies of Mounted Infantry, one battery Royal Field Artillery, and one battalion of Infantry, and the General Officer Commanding detailed in operation orders one section of my Field Ambulance to accompany it. In almost all the work done at staff tours I have noticed a Bearer Sub-division of a Field Ambulance detailed for the advance guard.

On thinking the question over I feel sure both these practices are wrong. In both cases the ambulance wagons are very conspicuous objects, and there would seem to be grave objections to pushing them so far to the front, and so probably revealing the position of the troops to the enemy. If a section be detailed it would seem to be too much for such a force as I have generally seen in an advance guard, and there is also the likelihood of losing touch with it for the whole day, as invariably occurred at the manœuvres, when its services might be required elsewhere.

In the second case, a Bearer Sub-division can only render first aid with its equipment; nor do I think it likely the stretcher parties could be employed so early in an action or its wagons move about without drawing fire.

I am therefore inclined to think the proper detachment from the Field Ambulance should be a dressing-station party with an officer, and the equipment carried in the forage cart. The instructions I should give the officer would be to keep well to the rear of the advanced guard without losing touch with it, and that as soon as fighting began he should establish an advanced dressing station, to which casualties should be directed; if possible, he should also collect some local transport and have it ready to take the wounded back as soon as the main body has passed his station. If the advanced guard were driven back he could then take his casualties with him without seriously blocking the road, and one must not forget that a section of a Field Ambulance requires 130 yards of road space.

I should be glad to learn officers' views on this matter, or if it has been considered by the General Staff.

I am, &c.,
W. MOULD,
Major, R.A.M.C.

Dover,
November 6th, 1910.

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Original Communications.

ON THE VIABILITY AND POSSIBLE VARIATION OF THE *BACILLUS TYPHOSUS*.

BY MAJOR W. H. HORROCKS.
Royal Army Medical Corps.

THE VIABILITY OF THE BACILLUS TYPHOSUS.

THE experimental work recorded up to the present has appeared to prove conclusively that the life of the *B. typhosus* in unsterilised soil and water is short. Experiments made in conjunction with Colonel Firth showed that in sewage-polluted soil the typhoid bacillus did not live longer than seventy-four days. Houston's[1] work on the vitality of the *B. typhosus* in raw Thames water demonstrated that 99 per cent. of the typhoid bacilli disappeared during the first week of storage, but a few, specially resistant bacilli, sometimes persisted for several months.

In all these experiments with soil and water *pure* cultures of the *B. typhosus* were added to the various samples of earth and water. Morgan and Harvey, working with the urine of a typhoid carrier, found the duration of life of the *B. typhosus* under natural conditions to be limited to about thirty hours.

Impressed with this result, I determined to repeat their experiments, employing as the infecting material urine and fæces of typhoid carriers and of recent cases of enteric fever. The results of these experiments are given in Table A. It will be seen that under

[1] This paper was written before the publication of Dr. Houston's Sixth Report on Research Work.

TABLE A.

Nature of the experiment and date	Probable number of typhoid bacilli present at the beginning of the experiment	Latest date of recovery and number of bacilli found	Duration of life of *B. typhosus* under the conditions of the experiment	Remarks
I. Sandy soil moistened with urine of Carrier I. May 7, 1909	12,000 per grm. of soil	May 14, 1909, 330 per grm. of soil	7 days ..	Soil allowed to dry at laboratory temperature.
II. Humus from garden moistened with urine of Carrier I. May 7, 1909	6,000 per grm. of soil	May 14, 1909, 40 per grm. of soil	Ditto.. ..	Ditto.
III. Humus from garden moistened with urine of Carrier I. June 4, 1909	1,660 per grm. of soil	June 14, 1909, 280 per grm. of soil	10 days ..	Exposed on verandah; no rain fell; soil quite dry on June 14, 1909.
IV. Stool of Carrier C. added to water. May 18, 1909	At least 50,000 per cc. of water	May 20, 1909, 200 per cc.	2 days ..	Flask kept in the dark; marked multiplication of associated bacteria.
V. Urine of Carrier I. added to tap water. June 22, 1909	At least 2,000 per cc. of water	July 3, 1909, 2 per cc. (574 per cc. on June 23. 2 per cc. on June 30)	11 days ..	Flask exposed to light in the laboratory; marked multiplication of associated bacteria.
VI. Stool of Carrier C. added to tap water. May 23, 1909	At least 100,000 per cc. of water	May 25, 1909, 200 per cc.	2 days ..	—
VII. Urine of convalescent case of enteric fever S. added to tap water. November 10, 1910	70,000 per cc. of water	November 20, 1910, 10,000 per cc	10 days ..	When this experiment was begun it was thought that the urine contained *B. typhosus*; further study of the microbe showed that it was a form intermediate between *B. typhosus* and *B coli* (Bacillus S., *see* p. 247).
VIII. Urine of convalescent case of enteric fever S. added to tap water. December 1, 1910	1,000,000 per cc of water	No typhoid bacilli found on Dec. 8, 1910	Less than 7 days	This urine contained typical typhoid bacilli. Flask exposed to light.

IX. Stool of Carrier C. added to tap water. July 7, 1909	190,000 per cc. of water	Typhoid bacilli not found on July 10, 1909	Less than 3 days	Flask exposed to light.
X. Do.	19,000 per cc. of water	Ditto	Ditto.. ..	Ditto.
XI. Urine of Carrier I. kept in a test tube exposed to light and then added to sterile water. October 1, 1910	100,000 per cc. of water	Feb. 7, 1911, 10,000 per cc.	Still alive (4 months)	When the urine was added to the water it appeared to be a pure culture of *B. typhosus*.
XII. Stool of Carrier C. mixed with garden earth May 14, 1909	More than 1.000,000 per grm. of mixture	A week later no signs of the *B. typhosus* could be discovered	Less than 7 days	Kept in a dark cupboard.
XIII. Stool of Carrier C. covered with garden earth. May 18, 1909	Ditto	Ditto	Ditto ..	
XIV. Urine of Carrier I. added to sandy soil, which was then exposed to light. May 21, 1909	43,250 per grm. of soil	*B. typhosus* not recovered a week later	Ditto ..	Soil exposed to heavy rain.
XV. Stool of Carrier C. kept in a glass bottle exposed to light. May 18, 1910	10.000.000 per grm. of stool	May 25, 1910, 20,000 per grm of stool	7 days ..	When passed this stool appeared to contain less than 1,000 *B. coli* per grm.
XVI. Urine of Carrier S. placed in a test-tube plugged with cotton wool and exposed to light. July 2, 1909	12,000 per cc. ..	November 28, 1909, at least 10,000 per cc.	57 days ..	All the urine expended on November 28, 1909.
XVII. Urine of Carrier I. kept as in XVI. May 25, 1909	1,000,000 per cc. ..	April 23. 1910. 1.000.000 per cc.	11 months ..	All the urine expended on April 23, 1909. Reaction of urine neutral.
XVIII. Urine of Carrier I. kept as in XVI. June 26, 1909	At least 1.000,000 per cc.	Sept. 3. 1910 1.000.000 per cc.	14 months ..	Reaction of urine neutral.

Note.—In Experiments XII. and XIII., the object was to ascertain how long the *B. typhosus* would survive under conditions likely to be met with in the disposal of fæces on the trench system.

these conditions the viability of the *B. typhosus* is much shorter than when pure cultures of the microbe are employed. When typhoid urine and fæces are thoroughly mixed with water or earth the specific bacilli rapidly disappear, and a week after the pollution 99 per cent. of the added bacteria seem to have been destroyed.

The rapid disappearance of typhoid bacilli from typhoid dejecta, whether intimately mixed with earth, or merely covered over as in a trench, or simply deposited on the surface of the ground, is very remarkable, and forms a marked contrast to the prolonged life of the *B. typhosus* in urine kept in flasks. When the urine of a typhoid carrier was kept in flasks exposed to light in the laboratory and frequently opened to the external air, 1,000,000 typhoid bacilli per cubic centimetre were found at the end of fourteen months. It was noted that the specimens of urine in which the typhoid bacilli maintained their existence in practically undiminished numbers showed no change in reaction during the whole of the time the samples were under observation. The specimens contained streptococci, *B. coli*, *B. fluorescens liquefaciens* and *non-liquefaciens*, and a bacillus corresponding very closely to the *B. fæcalis alkaligenes*; these microbes were present in comparatively small numbers as compared with the typhoid bacilli and showed no sign of multiplication in the urine, dilutions above 1,000 always giving practically pure cultures of the *B. typhosus;* yet the moment such a urine was diluted with water an enormous increase of the associated microbes occurred and the typhoid bacilli rapidly disappeared. The following experiment illustrates this point very well: A specimen of urine from a typhoid carrier was plated in various dilutions on bile-salt neutral red lactose agar and found to contain more than 6,000,000 typhoid bacilli and less than 1,000 colon bacilli per cubic centimetre. A sample of water which did not contain *B. coli* in 5 cc. was mixed with this urine in the proportion of one part of urine to five of water, so that each cubic centimetre of the mixture contained over 1,000,000 typhoid bacilli and less than 200 colon bacilli; six days later 6,000,000 colon bacilli per cubic centimetre of the mixture were counted, and at the end of the seventh day they had increased to 7,000,000,000 per cubic centimetre.

The constancy of the cultural characters of the typhoid bacilli isolated from the urine kept in flasks is also worthy of note. The urines were examined weekly, and the typhoid bacilli which lived in one specimen for more than fourteen months gave reactions identical with those obtained at the first examination; they, however, showed a remarkable resistance to the action of the agglu-

tinins present in an antityphoid serum. The following table gives the results obtained :—

Typhoid bacillus	Dilutions of serum 1—50	1—100	1—500	1—1,000
Strain I. isolated after 4 weeks	+	+	+	+
,, ,, ,, 14 months	+	+	0	0
Laboratory strains—				
B. typhosus R and E	+	+	+	+

In view of the feeble reaction of strain I., isolated after fourteen months in urine, and to prove its identity with *B. typhosus*, the culture was injected into a rabbit to see if it would produce agglutinins specific for the typhoid bacillus. The following results were obtained :—

Typhoid bacillus	Dilutions of rabbit serum injected with Strain I. 1—20	1—40	1—100	1—200	1—500	1—1,000
Laboratory strains—						
B. typhosus R. and E.	+	+	+	+	+	±
Homologous strain—						
B. typhosus 1. ..	+	±	+	0	0	0

It will be seen that the titre of the serum was higher for the laboratory strains than for the homologous strain.

Major Cummins also examined the rabbit serum for opsonins and reported that it had a marked opsonic reaction for a virulent strain of *B. typhosus*.

As a final test the strain I. was examined as to its power of absorbing agglutinins from a known typhoid serum ; the following results were obtained :—

	Dilutions of serum untreated 1—20	1—50	1—100	1—500	1—1,000
Tested with *B. typhosus* R. ..	+	+	+	+	+
	Dilutions of serum after absorption with Strain I.				
Tested with *B. typhosus* R. ..	0	0	0	0	0

Experiments were then made to determine the virulence of *B. typhosus* excreted in the urine of typhoid carriers I. and S. after the urine had been kept for various periods at the laboratory temperature exposed to light.

Experiment 1.—The urine of carrier I., passed on June 6th, 1909, was plated in January, 1910, and a pure culture of *B. typhosus* recovered. A subculture on agar was prepared and after twenty-four hours' incubation at 37° C., $\frac{1}{10}$ of the growth was injected into the peritoneal cavity of a guinea-pig. Next morning the animal was found dead, and from the peritoneal fluid and spleen a pure culture of *B. typhosus* was isolated.

Experiment 2.—The urine of carrier I., passed on March 25th, 1909, was plated on March 23rd, 1910, and found to contain 1,000,000 typhoid bacilli per cubic centimetre. A subculture from the agar growth of one of the colonies was incubated for twenty-four hours at 37° C., and one standard loopful, weighing 2 milligrammes, was injected into the peritoneal cavity of a guinea-pig. Next morning the animal was found dead and a pure culture of *B. typhosus* was isolated from the peritoneal fluid.

Experiment 3.—The agar slope used in Experiment 2 was kept at the laboratory temperature for three weeks and subcultured. One standard loop, 2 milligrammes, of the culture was injected into the peritoneal cavity of a guinea-pig. The animal remained perfectly well.

Experiment 4.—The urine of carrier S., passed on April 12th, 1910, was plated on April 21st, and found to contain typhoid bacilli. A subculture on agar was made from one of the colonies and one standard loop of the twenty-four hours' growth was injected into the peritoneal cavity of a guinea-pig. The animal was found dead next morning. No typhoid bacilli, however, could be found in the peritoneal fluid, which contained a pure culture of a Gram positive streptococcus giving the following reactions: Glucose, acid, no gas; mannite, acid, no gas; lactose, acid, no gas; dulcite, unchanged; salicin, acid, no gas; cane sugar, acid, no gas; neutral red, unchanged (aerobic conditions); broth, diffuse growth consisting of short chains; gelatine, not liquefied.

[*Note.*—This streptococcus is apparently identical with the one isolated in Experiment II. and during the subsequent intraperitoneal passages. See p. 239.]

Experiment 5.—The culture employed in Experiment 4 was again subcultured on May 7th, and tested in the usual manner; it appeared to be quite pure, no streptococci could be detected. A standard loop of the twenty-four hours' growth was then injected as in the previous experiment. The animal remained perfectly well.

Experiment 6.—The urine of carrier I., passed on June 22nd, 1909, and kept in a test-tube exposed to light in the laboratory for a year, was still found to contain 1,000,000 typhoid bacilli per cubic centimetre. Two colonies isolated from the plate containing $\frac{1}{1000000}$ cc. were planted on agar and labelled I.B. Colony 1 and I.B. Colony 2.

I.B. Colony 1.—One standard loop of a twenty-four hours' subculture on agar was injected into the peritoneal cavity of a guinea-pig. The animal was found dead next morning. From the heart's

blood a pure culture of *B. typhosus* was isolated, but the spleen and peritoneal fluid contained in addition to the *B. typhosus* a motile Gram negative bacillus which gave the following reactions: Glucose, acid and gas; lactose, acid and gas; mannite, acid and gas; dulcite, acid and gas; salicin, unchanged; cane sugar, unchanged; neutral red, gas and fluorescence; broth, no indol; litmus milk, acid, no clot; gelatine, not liquefied.

A broth culture from the original agar slope used in this experiment was carefully examined and found to give all the cultural reactions of *B. typhosus*. The broth culture was then planted on agar and a standard loop of the twenty-four hours' growth was injected into the peritoneal cavity of a fresh guinea-pig. The animal remained perfectly well, and from the peritoneal fluid a pure culture of *B. typhosus* was recovered.

I.B. Colony 2.—The agar growth from this colony was examined in the same manner as colony 1. The guinea-pig which received 2 milligrammes of the twenty-four hours' growth was found dead next morning. From the peritoneal fluid, in addition to *B. typhosus*, a coliform bacillus was isolated; but the cultures from the spleen and heart's blood proved to contain only typhoid bacilli.

Experiment 7.—The urine of carrier I., passed on June 22nd, 1909, and preserved in a test-tube until September 3rd, 1910, was still found to contain 1,000,000 typhoid bacilli per cubic centimetre. On September 8th, one standard loop from the agar growth of one of the colonies was injected into the peritoneal cavity of a guinea-pig. Next morning the animal, being ill, was killed with chloroform, so as to obviate *post-mortem* changes, and cultures were made from the peritoneal fluid, spleen, and heart's blood. In the spleen and peritoneal fluid a bacillus belonging to the coli group was present in pure culture; the blood, however, contained only a pure culture of *B. typhosus*.

In order to ascertain whether the coliform organism had any connection with the typhoid bacillus a culture was injected into a rabbit. No typhoid agglutinins, however, were produced: in spite of repeated injections the titre of the serum never rose above a dilution of 1—20.

The culture also failed to absorb agglutinins from a known typhoid serum.

Experiment 8.—The culture of *B. typhosus* used in the previous experiment was kept at the laboratory temperature for fourteen days; a standard loop of the agar growth was then injected into

the peritoneal cavity of a guinea-pig. The animal remained perfectly well, and *B. typhosus* in pure culture was recovered from the peritoneal fluid.

It is difficult to explain these irregular results. The guinea-pigs were quite healthy when the experiments were commenced, and *post-mortem* examinations made after the injections revealed no signs of disease. The same amount of culture, 2 milligrammes, was weighed in the standard loop for each experiment, and the guinea-pigs were of approximately the same weight. The only variant was the unknown bodily resistance of each guinea-pig. It will be seen that the *B. typhosus*, which survived in urine for a year, was apparently just as virulent as a strain isolated only nine days after the excretion of the urine. The rapid loss of virulence of the strains after subculture in broth and on agar is worthy of note.

On the Possible Variation of the B. typhosus.

The experiments on the viability of the *B. typhosus* having shown that the vital action of the associated bacteria, and possibly the toxins derived from them, appear to cause a rapid destruction of the typhoid bacillus, it seemed desirable to study the effect of symbiosis with these bacteria and the action of their toxins separately, so as to ascertain whether the *B. typhosus*, under certain conditions, might not change its cultural characters, and so escape recognition.

Symbiosis of B. typhosus with B. fluorescens non-liquefaciens.

A culture of *B. fluorescens non-liquefaciens* was isolated from the urine of "typhoid carrier" S., and planted out in the usual media. The cultural characteristics were as follows:—

Glucose, faintly acid, no gas: mannite, lactose, salicin, dulcite, cane-sugar, unchanged; neutral red, slight yellow colour; litmus milk, faintly alkaline; gelatine, not liquefied, green pigment present; broth, diffuse growth, green colour present, no indol formation; morphology, very motile bacillus, Gram negative; growth at 37° C., good.

A twenty-four hours' broth culture of this bacillus was prepared, and 0·5 cc. of it and 0·5 cc. of a twenty-four hours' broth culture of *B. typhosus* were added to 9 cc. of tap-water. The tube was placed in a dark cupboard of the laboratory.

Dilutions from the mixed growth were then made up to 100,000 millions and plated on MacConkey's bile-salt media. After

forty-eight hours' incubation the plates showed that 95,000 million typhoid bacilli were present in the tube. A week later the contents of the tube had a marked green colour, and 200,000 million colonies of the fluorescent bacillus per cubic centimetre were counted. Further examinations were made at intervals of a week for the next four months. It was soon found impossible to isolate the typhoid bacillus by "direct plating" as the *B. fluorescens* had increased so enormously; but when the dilutions were enriched by growth in MacConkey's bile-salt broth for twenty-four hours and then plated, it was quite easy to separate the two organisms. It was noticed as time went on that the *B. typhosus* diminished in numbers, but at the end of four months it was still present in $\frac{1}{100000}$ cc. of the original tube, its cultural reactions were quite unchanged, and it was still agglutinated by antityphoid serum.

Result.—The toxins of the *B. fluorescens non-liquefaciens* appear to have no influence in producing variation of the *B. typhosus*.

Symbiosis of B. typhosus and B. coli.

Experiment 1.—In this experiment the symbiosis of *B. typhosus* (R) and a type of *B. coli* isolated from the urine of a typhoid carrier (Bomb. S.) was studied. The cultural characteristics of the *B. coli* were as follows: Glucose, acid and gas; mannite, acid and gas; lactose, acid and gas; salicin, gas, acid slight; dulcite, gas, acid slight; cane sugar, unchanged; litmus milk, acid and clot in seven days; broth, no indol reaction; gelatine, not liquefied; neutral red, gas and yellow colour in seven days; morphology, short bacillus, Gram negative; actively motile. A small particle of a twenty-four hours' growth on agar of each organism was added to 10 cc. of sterilised tap water and the whole thoroughly mixed. Dilutions were then made and plated, and counts showed that 600,000 million typhoid bacilli and 300,000 million colon bacilli were present in each cubic centimetre of the infected water.

Ten days later an examination showed typical colonies of *B. typhosus* and others white and opaque. The latter when fished and planted in the usual media did not ferment any of the sugars in twenty-four hours and the growth on agar was thick and rather opaque. After forty-eight hours there was slight acid in mannite, but no other sugar was fermented even in seven days. The agar growth was planted out again on agar and the resulting growth tested in sugars. Typical reactions of *B. typhosus* were now obtained.

The infected water was plated from time to time and *B.*

typhosus was recovered in gradually decreasing numbers for two months. Examinations at later dates were negative as regards *B. typhosus*, only *B. coli* being isolated.

Experiment 2.—This experiment was carried out in the same manner as the one just described, a different strain of *B. typhosus* (Bombay) being employed. By plating dilutions of the infected water 5,000 million typhoid bacilli and 38,000 million colon bacilli were found in 1 cc.

A week later no signs of typhoid bacilli could be detected. The colon bacilli were still present to the extent of over 1,000 million per cubic centimetre and their cultural characteristics were unchanged.

Experiment 3.—This was a repetition of experiment 2. By plating dilutions, 19,000 million typhoid bacilli and 36,000 million colon bacilli were found in 1 cc. of the inoculated water. A week later more than 1,000 million typhoid bacilli were still present. At the end of two months no typhoid bacilli could be isolated; but on adding 1 cc. of the inoculated water to MacConkey's bile-salt broth and plating on lactose bile-salt litmus agar a few blue colonies were seen. These were found to consist of a bacillus which did not ferment any sugar, and produced an alkaline reaction in milk. At later examinations only *B. coli* was recovered.

Experiment 4.—In this experiment a small particle of a twenty-four hours' agar growth of *B. coli* was added to 2 cc. of urine passed by typhoid carrier I. At the time of the experiment the urine had been kept in a test-tube exposed to light in the laboratory. It was known to contain 10,000,000 typhoid bacilli per cubic centimetre; *B. coli* was also present, but the numbers were only about 1,000 per cubic centimetre. Counts were made frequently, but during the whole time the urine had been kept in the laboratory the *B. coli* had not increased appreciably. After adding the culture of *B. coli* from the agar slope counts showed that the urine contained at least 3,000 million colon bacilli per cubic centimetre.

Three days after the inoculation the urine was again plated in dilutions from $\frac{1}{1000}$ cc. to $\frac{1}{10000000}$ cc. No signs of the *B. typhosus* could be discovered, although the uninoculated urine still showed 10,000,000 typhoid bacilli per cubic centimetre.

The inoculated urine was then enriched by adding 0·5 cc. to 10 cc. of broth. A marked growth occurred after twenty-four hours incubation at 37° C., but on plating the broth no signs of *B. typhosus* could be discovered.

Experiment 5.—This experiment was a control of No. 4; but

instead of a pure culture of *B. coli* a small particle of normal solid fæces was added to the urine. Counts made by plating the inoculated tube showed at least 60,000,000 colon bacilli had been added to the urine. Five days later at least 10,000,000 typhoid bacilli were still present. At the end of a week, however, all the typhoid bacilli had disappeared. Enrichment methods and selective media were tried, but with uniformly negative results.

Remarks.—These experiments show clearly that *B. coli* has an inimical influence on the *B. typhosus*. Experiment 1 indicated that changes were commencing, and in Experiment 2 a variation to a non-fermenting type was apparent.

ON THE EFFECT OF THE TOXINS PRESENT IN WATER AFTER ADMIXTURE WITH FÆCES AND URINE OF TYPHOID CARRIERS.

Nine experiments were made with fæces and twenty-three with urine.

Experiments with Fæces.

In eight of the experiments an attempt was made to extract the toxins present in the dejecta by thoroughly shaking weighed quantities with tap-water until a thin uniform emulsion was produced; this was then filtered, and the filtrate inoculated with a strain of *B. typhosus*. Dejecta from three "carriers" were used, and the toxins were extracted after the fæces had been kept for varying periods at laboratory temperature. In the ninth experiment the rich emulsion of fæces and water was allowed to stand for six days at the laboratory temperature, exposed to light so as to allow toxins to be formed by the bacteria present in the water and fæces. Table B gives the results obtained. It will be seen that the *B. typhosus* was not changed in any way, and its viability apparently depended on the length of time the particular stool had been kept before the extract was made. It is of interest to note that the extract from a stool rich in *B. coli* destroyed the typhoid bacillus more quickly than a corresponding extract from a stool containing comparatively few *B. coli*. The reaction of the filtrate was neutral in each experiment.

Experiments with Urine.

In this series definite quantities of urine were added to water, and the mixture was kept for varying periods in flasks at room temperature and exposed to light. The contents of the flasks were then filtered through sterile Doulton or Pasteur (F) candles; no pressure was employed. The filtrate collected at the end of three

TABLE B.

Name of typhoid carrier	Length of time the stool had been kept at room temperature	Proportion of stool to water	Strain of *B. typhosus* added to the filtrate	Duration of life of *B. typhosus*	Result	Remarks
Gnr. C. ..	3 hours	1 in 500	*B. typhosus*, C.	28 days	*B. typhosus* unchanged	Stool rich in *B. coli* and *B. typhosus* when extracted with water.
Bomb. S. ..	,,	,,	,,	,,	,, ,,	Ditto
Pte. C. ..	3 days	1—1,000	*B. typhosus*, R.	52 days	,, ,,	Stool contained less than 1,000 *B. coli* per grm.; *B. typhosus* still present.
,, ..	5 ,,	1—100	,,	35 ,,	,, ,,	Ditto
,, ..	8 ,,	1—100	,,	31 ,,	,, ,,	Ditto
,, ..	13 ,,	1—100	,,	22 ,,	,, ,,	*B. typhosus* not isolated from the stool.
,, ..	23 ,,	1—100	,,	6 ,,	,, ,,	Ditto
Pte. L. ..	7 ,,	1—100	,,	3 ,,	,, ,,	Stool rich in *B. coli*; *B. typhosus* not isolated at the time the extract was made.
Pte. C. ..	23 ,,	1—100	,,	6 ,,	,, ,,	In this experiment the emulsion of fæces and urine was allowed to stand six days before filtration, so as to allow toxins to be formed by the action of the living bacteria.

hours was tested for sterility and then inoculated with a strain of *B. typhosus*.

Twenty-three experiments were made on these lines, but only four yielded positive results. These will now be considered in some detail.

Experiment I. (33 *in the Register*).—On August 8th, 1909, a specimen of urine from typhoid "carrier" S. was diluted 1 in 10 with tap water, placed in a flask, and exposed to daylight. Eleven days later the mixture of urine and water was filtered through a Pasteur candle (F) without pressure. The filtrate collected after three hours was plated on large bile-salt neutral red lactose agar plates, 0·5 cc. of the filtrate being carefully spread over the surface of the solid agar in the plates. The plates remained quite sterile after prolonged incubation at 37° C. The filtrate was then inoculated with a small particle of a forty-eight-hours' agar growth of *B. typhosus*, isolated from the stool of "carrier" C. After thoroughly mixing the agar growth with the filtrate, dilutions were made and plated; the counts showed that the inoculated filtrate contained 480,000,000 typhoid bacilli per cubic centimetre.

On August 25th, 1 cc. of the inoculated filtrate was diluted up to 1,000,000,000, and plated on bile-salt neutral red lactose agar. In the plate containing $\frac{1}{10000}$ cc. six colonies were seen; two of these were fished and planted out in the usual media. The following results were obtained:—

	Glucose	Mannite	Lactose	Salicin	Dulcite	Cane sugar	Litmus milk	Broth	Gelatine	Neutral red	Motility	Agglutination with typhoid serum
Col. 1 ..	0	Acid	0	0	0	0	Acid, then alkaline	No indol	NL	0	+	0
Col. 2 ..	0	0	0	0	0	0	Unchanged, then alkaline	No indol	NL	0	+	0

In the plate containing $\frac{1}{1000}$ cc. there were numerous colonies like those of *B. typhosus*; two were fished and planted out in the above media. The first colony gave all the reactions of *B. typhosus;* the second colony appeared to be identical with colony 2 in the $\frac{1}{10000}$ cc. plate.

On August 28th the inoculated filtrate was again diluted and plated; colonies were fished and planted out as before; none of these fermented any of the sugars, and they appeared to be identical with colony 2, isolated on the previous occasion.

The inoculated filtrate was again examined during September, October, and November, 1909; no signs of the *B. typhosus* were

ever discovered; all the bacteria present gave the reactions of colony 2.

Experiment II. (35 *A in the Register*).—A sample of urine from a typhoid carrier S., passed on September 24th, 1909, and containing 3,890,000 typhoid bacilli when received next day, was diluted 1 in 10 with tap water, and placed in a cupboard of the laboratory, protected from light. On October 8th the mixture of urine and water, which was now turbid and yellow in colour, was filtered through a sterilized Pasteur candle (F), at ordinary atmospheric pressure. At the end of three hours the filtrate obtained was placed in two sterile test-tubes, and 2 cc. of it was added to sterile broth; after seventy-two hours incubation at 37° C. the broth tube remained quite sterile. One of the tubes containing the filtrate was then inoculated with a small loopful of a twenty-four-hours' agar culture of *B. typhosus* (R), the stock typhoid culture employed in the manufacture of vaccine at the Royal Army Medical College. The inoculated tube and the uninoculated tube, which served as a control, were placed in a dark cupboard. On October 14th and 20th a portion of the contents of the inoculated tube was diluted and plated on neutral red bile-salt lactose agar; 338,000,000 typical typhoid bacilli per cubic centimetre were isolated. On October 25th the control tube was plated in the same manner; no growth occurred in any of the plates. On November 11th dilutions of the inoculated tube were again plated, in the plate containing $\frac{1}{10000000}$ cc. forty-two colonies appeared; one of these, labelled 35 A, colony 1, gave all the reactions of the typhoid bacillus (R), but twelve of the remaining colonies did not ferment glucose; one of these, labelled 35 A, colony 2, was then planted out in the usual media, when the following results were obtained:—

	Glucose	Mannite	Lactose	Salicin	Dulcite	Cane sugar	Litmus milk	Broth	Gelatine	Neutral red	Motility	Agglutination with anti-typhoid serum
35A, Col. 2..	0	0	0	0	0	0	Acid	No indol	Not liquefied	0	+	0
35A, Col. 1..	A No G	A No G	0	0	A No G	0	Acid	No indol	Not liquefied	0	+	+ (1—1,000)

On November 11th the contents of both tubes were again plated. The plates made from the contents of the inoculated tube showed colonies, all of which gave the same reactions as 35 A, colony 2, just described, except that the litmus milk, which was first rendered acid, became distinctly alkaline at the end of seven days' incubation at 37° C.; no signs of the *B. typhosus* could

be found in the plates. The contents of the control tube showed no growth after the plates had been incubated for four days.

On January 1st, 1910, a large loopful of the inoculated filtrate was plated on glucose bile-salt litmus agar and 1 cc. of the control filtrate was added to broth. The control after seven days' incubation at 27° C. showed no growth, but in forty-eight hours blue colonies appeared in the glucose plates. These colonies when tested in the usual media again failed to ferment any sugar and produced an alkaline reaction in milk.

On February 3rd and March 2nd, 1910, similar results were obtained. On March 24th a loopful of the inoculated filtrate was again plated, but no growth occurred, showing that the bacteria were diminishing in numbers. Four cubic centimetres of the inoculated filtrate were then added to broth, which was incubated at 37° C. A growth occurred in forty-eight hours and a loopful of this was plated on MacConkey's medium. In the plates large and small colonies appeared; the large colonies consisted of a Gram negative motile bacillus which gave the same reaction as 35 A; the small colonies were made up of a rather large Gram positive coccus.

The latter organism when tested gave the following reactions: Glucose, acid, no gas; mannite, acid, no gas; lactose, acid, no gas; salicin, acid, no gas; dulcite, unchanged; cane sugar, acid, no gas; broth, diffuse growth, no indol; litmus milk, acid and clot; gelatine, not liquefied; neutral red (anaerobic condition), yellow. This streptococcus has a close resemblance to the *Streptococcus fæcalis*. It is possible, of course, that the streptococcus might have been a contamination introduced from without, in view of the length of time the inoculated tube had been under observation and the frequency with which it had been opened. Experiments to be recorded later, however, seem to show that the streptococcus might have been produced from the bacillus present in the contents of the inoculated tube.

Experiment III. (37 *in the Register*). A specimen of urine passed by "carrier" I. on September 24th, 1909, and containing more than a million typhoid bacilli when received next day, was diluted 1 in 10 with tap water and poured into a flask, which was then plugged with cotton wool and placed in a cupboard of the laboratory. On October 8th, the mixture of urine and water was filtered through a sterilised Doulton candle at atmospheric pressure. The filtrate obtained at the end of three hours was placed in two sterile test-tubes and 2 cc. of it was added to sterile broth. After seventy-two hours' incubation at 37° C., the broth tube showed no signs of

growth. One of the tubes containing the filtrate was now inoculated with a small loopful of a twenty-four-hours' agar culture of *B. typhosus* (R). The inoculated tube and the second tube, which served as a control, were then placed in a dark cupboard.

On October 14th, the contents of the inoculated tube were plated and typical typhoid colonies, giving the same reactions as *B. typhosus* (R), were obtained.

On October 20th, an examination showed only typical typhoid bacilli to be present in the inoculated tube. On November 4th, typical typhoid bacilli were once more isolated from the inoculated tube.

On November 10th the contents of the inoculated tube and the control tube were plated. The control tube proved to be quite sterile, but in the inoculated tube no signs of the *B. typhosus* could now be discovered, it appeared to be replaced by a bacillus giving the same cultural reactions as 35 A in experiment II.

Experiment IV.—In this experiment the urine of "carrier" S. was mixed with an equal quantity of water in a flask, and exposed to light in the laboratory for four months. The mixture was then filtered through a sterile Doulton candle without pressure; only 12 cc. of filtrate was obtained at the end of two hours, of this 2 cc. was added to broth and incubated at 37° C. during the whole time the experiment lasted; no growth occurred in the broth. The 10 cc. of filtrate remaining was inoculated with a small particle of a twenty-four hours' agar growth of *B. typhosus* (R). A week later $\frac{1}{10}$ cc. of the inoculated filtrate was plated, but no growths occurred in the plates. Three cubic centimetres of the inoculated filtrate were then added to broth and incubated at 37° C. After three days' incubation the broth showed a growth, which was plated on glucose bile-salt litmus agar; after twenty-four hours at 37° C. the plates showed only blue colonies, consisting of bacilli, which, when subcultured, did not ferment any sugar, and produced a faintly acid reaction in milk. The microbe appeared to be identical with 35 A when that organism was first isolated.

The details of the remaining nineteen experiments are summarised in Table C. It will be seen that the reaction of the filtrates varied considerably; in those which became markedly alkaline the duration of life of the *B. typhosus* was short. That the viability of *B. typhosus* does not depend entirely on the reaction of the medium is evident from the results of Experiments 21 and 22.

TABLE C.

No. of experiment	Source of urine	Dilution with water	No. of days before filtration	Strain of *B. typhosus* planted in the filtrate	No. of days *B. typhosus* survived	Result	Remarks
5	Recent case of enteric fever, A.	1—100	5	*B. typhosus* (R)	4 months	*B. typhosus* unchanged	Reaction of filtrate not tested
6	do.	1—10	5	,, (Bombay)	3 ,,	do.	Reaction of filtrate neutral
7	do.	1—10	5	,, (A)	4½ ,,	do.	do.
8	do.	1—10	9	,, (A)	5 ,,	do.	do.
9	do.	1—10	9	,, (R)	4½ ,,	do.	do.
10	do.	1—10	13	,, (R)	4½ ,,	do.	do.
11	do.	1—10	13	,, (A)	5 ,,	do.	do.
12	do.	1—100	13	,, (R)	6 weeks	do.	Control not sterile after prolonged incubation. Experiment abandoned
13	do.	1—100	13	,, (A)	2½ months	do.	Reaction alkaline, —6
14	Carrier I. ..	1—1	26	,, (R)	8 days	do.	do. —22
15	,, S. ..	1—10	7	,, (S)	11 ,,	do.	do. —30
16	,, S. ..	1—10	7	,, (I)	5 ,,	do.	Filtrate of 15, neutralised, refiltered, and again inoculated
17	,, I. ..	1—10	42	,, (R)	5 ,,	do	Filtrate alkaline, —30
18	,, S. ..	1—100	7	,, (R)	2½ months	do.	Reaction not tested
19	,, S. ..	1—10	18	,, (R)	15 days	do.	Reaction alkaline, —30
20	,, S. ..	1—10	18	,, (I)	15 ,,	do.	Filtrate of 19 neutralised and refiltered
21	Recent case of enteric fever, P.	1—10	21	,, (E)	2 months	do.	Reaction neutral
22	do. S.	1—10	36	,, (E)	21 days	do.	do.
23	Carrier S.	1—10	14	,, (R)	5 months	do.	Reaction not tested

FURTHER TESTS TO SEE IF THE BACILLUS, 35 A, DESCRIBED IN EXPERIMENT II. IS ABLE TO ABSORB AND PRODUCE AGGLUTININS SPECIFIC FOR THE B. TYPHOSUS.

The culture was planted out on three agar slopes, and the resulting growths were then used to absorb the agglutinins from a known anti-typhoid serum. After absorption the serum was tested with a laboratory culture of *B. typhosus* (strain Bombay).

Another portion of the same serum was absorbed with a culture of the *B. fluorescens non-liquefaciens* (isolated from carrier S.'s urine) and then tested with *B. typhosus* (strain Bombay). The following results were obtained :—

	Dilutions of serum untreated		
	1—100	1—500	1—1000
Tested with *B. typhosus* (Bombay)	+	+	+
	Dilutions of serum absorbed with *B. typhosus* (Bombay)		
,, ,, ,, ...	0	0	0
	Dilutions of serum absorbed with culture 35 A		
,, ,, ,, ...	+	+	0
	Dilutions of serum absorbed with *B. fluorescens*		
,, ,, ,, ...	+	+	+

As the culture 35 A appeared to have a slight power of absorbing agglutinins from antityphoid serum, it was decided to inject the culture into a rabbit to see if agglutinins specific for the *B. typhosus* would be produced. The following results were obtained :—

	Dilutions of rabbit's serum			
	1—20	1—40	1—80	1—160
Tested with Bacillus 35 A	+	+	±	0
B. typhosus (R)	+	±	±	0

In spite of repeated injections the titre of the serum remained as shown in the table. The agglutinins were completely removed by absorbing the serum with either *B. typhosus* or culture 35 A.

These results being indecisive, it was then determined to try the effect of intraperitoneal passage through a series of guinea-pigs. It was thought that if the bacillus (culture 33) isolated in Experiment I., and the bacillus (35 A) obtained in Experiment II., were derived from the *B. typhosus*, passage through a warm-blooded animal might cause these bacteria to revert to the original type.

PASSAGE OF CULTURE 33 THROUGH A SERIES OF GUINEA-PIGS.

A twenty-four hours' agar growth of the culture was emulsified in normal salt solution, and, approximately, one-tenth of the slope was injected into the peritoneal cavity of a guinea-pig, the fluid withdrawn after an interval of three hours was subcultured on agar,

and $\frac{1}{10}$ of the growth then injected into another guinea-pig. The peritoneal fluid was removed after eighteen hours, planted on an agar slope, and the resulting growth injected into a third guinea-pig. After three passages the culture was unchanged except in one experiment, in which the fluid was removed from the same guinea-pig after six hours and again after twelve hours. The fluid removed after six hours contained a short Gram negative bacillus, like *B. coli*, which produced acid and gas in glucose, lactose, mannite, cane sugar, dulcite, and salicin; it also clotted milk, produced indol in broth, and a yellow colour in neutral red. The fluid removed after twelve hours, however, contained a bacillus which gave the same reactions as the bacillus originally injected into the peritoneal cavity.

There appear to be two possible explanations for this result: (*a*) The *B. coli* was derived from the intestine of the guinea-pig, or (*b*) the culture 33 was changing its cultural characters, but was not yet stable and reverted to its original shape after twelve hours in the peritoneal cavity. Experiments to be recorded later suggest that the latter is the more probable explanation.

Passage of Culture 35 A through a Series of Guinea-pigs.

The culture was left in the peritoneal cavity of each guinea-pig of the series for a period gradually increasing from six to eighteen hours. After six passages the culture was quite unchanged, but the fluid removed after the eighth passage, when planted in broth, gave a growth consisting of cocci, or very short bacilli in pairs and short chains. The broth was plated on agar; two kinds of colonies appeared: (1) Medium sized, made up of bacilli, like the original 35 A; and (2) smaller colonies, consisting entirely of cocci in short chains. Colony (1) was fished and planted in broth; a growth of cocci appeared. This was then planted on agar, when only bacilli were seen. The agar slope was then tested in sugars, &c., with the following results: Glucose, acid, and gas; lactose, acid, no gas; mannite, acid, no gas; cane sugar, acid, no gas; dulcite, unchanged; litmus milk, acid and clot; neutral red, gas; gelatine, not liquefied.

As the morphology of this organism was found quite unstable, Gram negative bacilli or cocci appearing in the various media employed, it was determined to repeat the intraperitoneal passages, commencing this new series with a fresh culture isolated from the inoculated filtrate on January 1st, 1910. Before injection this culture was tested in sugars, &c., and found to give the original

reactions of 35 A. From the first to the fourth passage the culture was left in the peritoneal cavity of each guinea-pig for six hours, from the fifth to the eighth passage for eighteen hours, and from the ninth to the seventeenth passage for twenty-four hours. Up to this passage the culture remained absolutely unchanged, but after the eighteenth passage it gave the following reactions: Glucose, acid and gas; mannite, acid and gas; lactose acid, no gas; salicin, acid, no gas; dulcite, unchanged; cane sugar, unchanged. This culture was at once injected into another guinea-pig, making the nineteenth passage. *The growth obtained from the peritoneal cavity of this guinea-pig did not ferment any sugar, and gave the same cultural reactions as the culture at the commencement of the series of passages.* This result is extremely interesting as it seems to indicate clearly that as the culture, which after the eighteenth passage fermented certain sugars with the production of acid and gas, reverted to the original type, it must have been derived from the original culture, and was not a contamination from the peritoneal cavity. A subculture from the agar growth obtained at the eighteenth passage was planted from agar to agar and the third subculture obtained, which still fermented glucose, lactose, mannite, and salicin, was again passed through the peritoneal cavity of a fresh series of guinea-pigs. After six passages the same sugars were still fermented, but the gas formation was increased; litmus milk was also clotted with an acid reaction, and a yellow colour was produced in neutral red; there was, however, no indol formation in broth. Two further passages were made, but the culture still gave identical reactions. The culture, which reverted to the original type on the nineteenth passage was subjected to six more passages, but no change in the cultural reactions occurred, the bacillus still did not ferment any sugar, and caused an alkaline reaction in milk. At the next passage, however, a pure growth of a Gram negative bacillus was obtained, which produced slight acid in glucose, lactose, salicin, and cane sugar. On planting this bacillus in broth, chains of Gram positive cocci appeared mixed with bacilli, and on plating this broth culture two kinds of colonies were obtained—*i.e.*, (1) Medium-sized white colonies made up of Gram negative bacilli which did not ferment any sugar and produced an alkaline reaction in milk, and (2) small colonies made up of Gram positive cocci which produced acid, but no gas, in glucose, mannite, lactose, cane sugar, and salicin, and clotted milk. The Gram positive coccus was passed through three guinea-pigs, but maintained its characters, no signs of bacilli being seen.



FIG. 1.—Growth on agar after incubation for twenty-four hours at 37 ° C. × 1000.

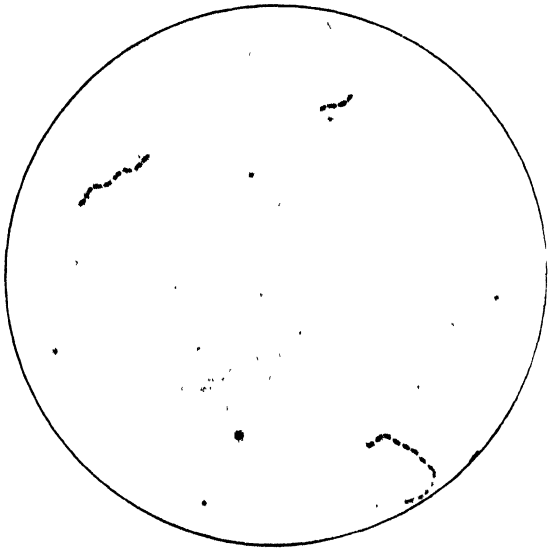


FIG. 2.—Growth on agar planted in broth and incubated for twenty-four hours at 37° C. × 1000.

It would be natural to suppose that this Gram positive coccus was an impurity derived from the peritoneal cavity of the guinea-pig. Against this view is the fact that the agar slope of the growth from the peritoneal cavity was kept for a week and stained frequently, but no Gram positive cocci appeared. On planting the growth on the agar slope in broth, however, definite chains of Gram positive cocci appeared in twenty-four hours (see figs. 1 and 2). It should also be noted that the streptococcus is apparently identical with that obtained in Experiment II.

The breaking up of a Gram negative bacillus into a Gram positive coccus in both series of passages seemed so extraordinary that it was determined to repeat the first series of passages, commencing, however, with the culture in this series which was quite unchanged in its characters after six passages. After passing this culture through another guinea-pig, this being the seventh passage, the bacillus was again recovered quite unchanged. At the next passage, however, the agar growth from the peritoneal fluid showed Gram negative bacilli and Gram positive cocci. This growth was planted in broth, next day the same bacilli and cocci were seen. The broth was plated and colonies, some consisting apparently of bacilli and others of cocci, appeared; when fished and planted out in broth, each of the colonies again produced Gram positive cocci mixed with bacilli. Owing to want of animals this line of investigation could not be pursued further. The results, while strongly pointing to a definite change in the culture 35 A, Col 2 by intraperitoneal passage, did not show that this culture had any connection with the *B. typhosus*.

Further Evidence as to the Possible Variation of the B. typhosus.

On October 12th, 1910, the urine of a typhoid convalescent case, T. S., from whose blood Major Cummins had previously isolated a pure culture of *B. typhosus*, was diluted and plated on bile-salt glucose litmus agar. In the plates containing $\frac{1}{1000000}$ cc. a bacillus was present which after three days' incubation at 37° C. gave the characteristic sugar reactions of *B. typhosus*. At the end of a week, however, there was slight production of acid in lactose, salicin, and dulcite, marked indol formation in broth, and neutral red showed a slight yellow colour; moreover, the bacillus was only feebly motile, and was not agglutinated by anti-typhoid serum. Obviously

at this time the urine of the patient contained a micro-organism intermediate between *B. typhosus* and *B. coli*.

The culture, labelled S. bacillus, was then injected into a rabbit to see if agglutinins specific for the *B. typhosus* would be produced. Ten days later the serum of the rabbit was tested with a laboratory strain of *B. typhosus* and with the homologous bacillus; the following results were obtained:—

	Dilutions of serum					
	1—10	1—50	1—100	1—200	1—500	1—1,000
Homologous bacillus ..	±	0	0	0	0	0
B. typhosus, E	+	+	+	+	±	0

The rabbit was then given a second injection and a week later the serum was again tested for agglutinins and opsonins. It was then found that the titre of the typhoid agglutinins had fallen and the laboratory strain of the typhoid bacillus was not completely agglutinated by the serum diluted only $\frac{1}{100}$. Major Cummins, who kindly tested the serum for typhoid opsonins, reported that the rabbit appeared to be suffering from a negative phase, the phagocytes ingesting only about half as many bacteria opsonised with the serum as compared with the control specimens made with normal serum. A week later, however, the agglutinins for the *B. typhosus* had again increased and the results given in the previous table were obtained once more. Moreover, at this time a marked opsonic reaction for *B. typhosus* was given by the serum.

The S. bacillus was next tested as to its power of absorbing agglutinins from a known typhoid serum which had a titre 1,000 for a laboratory strain of the *B. typhosus*. It was found that all the agglutinins specific for the *B. typhosus* were removed.

It was then determined to apply the test of deviation of complement. Captain L. W. Harrison, who has had considerable experience of this test, carried out the necessary manipulations, and reported that the serum of the S. bacillus rabbit deviated complement in the same manner as a known anti-typhoid serum. The effect of intraperitoneal passage through guinea-pigs was next tried, controlling each passage by subculturing the original culture of S. bacillus from agar to agar.

After four passages of the bacillus the power of fermenting lactose appeared to be lost and the micro-organism only differed from a typhoid bacillus in that it was feebly motile and produced a trace of acid in salicin. It was thought that by continuing the passages a true *B. typhosus* might be obtained. After four more passages, however, there was a complete reversion to the original

type and the cultural characters were exactly the same as those of the strain cultivated from agar to agar.

A second specimen of urine passed by the typhoid convalescent, T.S., on November 17th, 1910, was diluted and plated on November 18th, to see if the S. bacillus just described was being excreted continuously. No signs of it were detected, but 1 cc. of the urine now contained one million bacilli giving all the cultural reactions of *B. typhosus*. This bacillus was motile, readily agglutinated by antityphoid serum in a dilution of 1 in 1,000 and also absorbed all the agglutinins from a known typhoid serum.

Conclusions.

I. *The Viability of the B. typhosus.*

The experiments seem to indicate that the duration of life of the *B. typhosus*, as at present recognised, is very short under natural conditions; it is unlikely that the artificial conditions in a sterile test-tube, under which the typhoid bacillus survived for over a year, will find a parallel in nature. Whenever typhoid urine and fæces gain access to wells, springs, or cesspools, it seems probable that the action of the associated bacteria will cause the typhoid bacillus to disappear in a few days.

Soil bacteria appear to have a similar destructive power. Also when fæcal material is lightly covered with earth, or exposed to the atmosphere, the colon bacilli present exercise a marked inimical influence on the typhoid bacilli. If the dejecta contain many *B. coli*, millions of typhoid bacilli disappear in two or three days, and even if the typhoid bacilli are a thousand times more numerous than the *B. coli*, a similar result follows in about a week.

II. *The Possible Variation of the B. typhosus.*

(1) Symbiosis of the *B. fluorescens non-liquefaciens*, present in the urine of typhoid carriers, and the *B. typhosus* does not cause any change in the cultural character of the latter microbe.

(2) Symbiosis of *B. coli* and *B. typhosus* appears to cause a rapid destruction of the typhoid bacillus; in two experiments there was evidence of a change in the typhoid bacillus, but many more experiments must be undertaken before a definite statement can be made on this head. Possibly, if a smaller dose of *B. coli* had been used more definite results would have been obtained.

(3) The toxins extracted by water from the fæces of typhoid

carriers do not appear to produce any changes in the cultural characters of the *B. typhosus*.

(4) The toxins formed in a mixture of one part of urine from a typhoid carrier and nine parts of tap water after varying periods at the laboratory temperature, in four instances caused the typhoid bacillus to change into a bacillus having a close resemblance to the *B. fæcalis alkaligenes*. Intraperitoneal passage through a series of guinea-pigs did not again convert this bacillus into the *B. typhosus*, but a bacillus having many of the characters of *B. coli* appeared. When introducing a foreign microbe into the peritoneal cavity of a guinea-pig it is always possible that the injection may cause a change in the coats of the intestines, and so lead to a passage of *B. coli* from the intestine into the peritoneal cavity. This might be the explanation of the results obtained in the intraperitoneal passages made in connection with experiments I. and II., but that a real variation of the bacillus into a coli type occurred seems probable from the following facts:—

(*a*) In the intraperitoneal passage made with the bacillus 33, after three passages the *B. coli* type was recovered after six hours and the original type after twelve hours, from the *same* guinea-pig. If the *B. coli* type recovered after six hours had been an exudation from the bowel, it should have been present after twelve hours in even greater numbers. It might, however, be argued that the *B. coli* exuded had been destroyed by phagocytes after twelve hours, and the bacillus then recovered was derived from those originally injected which had proved more resistant to the action of the phagocytes.

(*b*) In the experiments with bacillus 35 A the same change into a coli type occurred in three series of passages. In one of the series, on injecting the coli type recovered after eighteen passages into another guinea-pig, a reversion to the original type occurred.

(*c*) The guinea-pigs were killed with chloroform and a careful *post-mortem* examination revealed no signs of peritonitis.

(5) A mutation, *i.e.*, a complete change of form as well as of the cultural characters, of the bacillus 35 A through a coli type into a streptococcus having the cultural characters of *S. fæcalis* occurred as a result of intraperitoneal passage. The objections mentioned under (4) might be advanced against this change, but the following points in favour of a mutation appear to have considerable weight:—

(*a*) The mutation from the coli type to the Gram positive streptococcus was gradual, at first the cocci obtained did not retain the Gram stain.

(*b*) The coccus type at first was very unstable, a change to a bacillary type readily occurring on changing the nutrient medium.

(*c*) The streptococcus obtained in each series had the *same* cultural characters.

(6) The isolation of the S. bacillus from the urine of a patient who was known to have suffered from a definite attack of enteric fever appears to be a strong proof of the possible variation of the *B. typhosus*. The S. bacillus had cultural characters intermediate between *B. typhosus* and *B. coli*, yet it produced in an animal agglutinins specific for the typhoid bacillus, removed agglutinins from a known typhoid serum, formed opsonins for the typhoid bacillus, and finally produced a serum which deviated complement in the same manner as a known typhoid serum.

THE VALUE OF TUBERCULIN.[1]

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In recommending the treatment of tubercular affections by the inoculation of tuberculin by the "intensive" method, I am fully aware that this method has its limitations. I do not wish to urge its adoption to the total exclusion of all other remedies, but I am anxious to set forth the results of my experience, explaining where there has been success and where difficulty has been found.

Whenever a new treatment or a new method of applying an old treatment is brought forward, the tendency is to expect too much. It must be recognised that the injection of tuberculin into the system will not always give immediately beneficial results. The disease has taken a long time to develop, and its cure must be expected to be gradual.

In the early stages of the disease the success that attends the use of tuberculin is marked, often remarkable. In the latter stages it is sometimes a difficult problem to decide whether the remedy should be recommended at all. The irksomeness of the treatment in these cases, and the distress it sometimes causes, not only tend to turn the patients against it, but the physician himself is apt to lose heart and give in. The only point is, if tuberculin is not used in the later stages of the disease, what other remedy can be used? There is nothing more distressing to the doctor than to feel that his measures are only palliative, that he is only alleviating the distressing symptoms and not placing his patient in the most favourable condition for Nature to effect a cure.

There is yet to be discovered a remedy which will act as it is believed Ehrlich-Hata "606" acts in syphilis, so that one injection or a few injections will be sufficient to kill all the tubercle bacilli in the body.

The use of tuberculin as a curative preparation originated from the experiments carried out by Koch many years ago; these experiments have been repeated and the results confirmed by many subsequent observers.

Koch inoculated animals with virulent tubercle bacilli, with the

[1] Paper read before the Aldershot Military Medical Society on November 26th, 1910.

result that in two or three weeks' time ulcers formed at the seat of the inoculations, and finally the animals died of tuberculosis.

These experiments were repeated, and at the stage of ulceration the animals were inoculated a second time. With some, large doses were given, causing death within forty-eight hours; with others, small does were given, causing the ulcers to heal and the animals to be restored to health.

He repeated these experiments, using dead cultures, but these he found inconvenient, as the injections caused local suppuration.

He again repeated these experiments, using a glycerine extract of tubercle bacilli, which had been cultivated in glycerinated veal-broth for several weeks. The beneficial results with this extract, called Old Tuberculin, were the same as with the virulent and dead cultures.

I do not propose to open a discussion upon the explanation of these phenomena from a bacteriologist's point of view. Each observer offers a different explanation. Each explanation can be severely criticised, and none can be considered to be fully satisfactory.

Speaking generally, and without entering into the methods of formation of the amboceptor, the attraction and source of the complement, the formation of various substances by cytolysis, bacteriolysis, &c., it is generally acknowledged that tuberculin acting on tubercular tissue does produce antibodies, and immunity is obtained by the presence of these antibodies. Also, reactions occur after the employment of tuberculin, the nature of which is not fully understood, giving beneficial results.

Perhaps the beneficial results may be caused merely by slight local reactions; an aseptic inflammation being set up round the lesions, and this inflammation being produced by the interaction of the antigen with the antibodies, causing the tissues in the neighbourhood of the lesions to be flushed with blood and so bringing the phagocytes more into action.

When the bacilli and their toxins are already present in the system, it might be expected that these, acting on the tissues, will themselves produce antibodies sufficient to cause immunity, and at first sight it would not appear desirable to introduce any more of the antigen. It must not be forgotten, however, that the toxins thus produced only come in contact with dead or diseased tissue, and probably this tissue is not suitable for the production of antibodies. If tuberculin is introduced from without and comes in contact with healthy tissues around the lesions, antibodies in large amount may be expected.

Auto-inoculation—namely, the discharge of a small amount of toxin from the affected part into the tissues sufficiently healthy to form antibodies—is referred to in this connection. Paterson, of Frimley, has done excellent work in this way by means of regulated exercise, by which auto-inoculation is secured. It would appear, though, that the dosage of tuberculin might be more accurately gauged by suitable doses from without, and more definite results obtained, provided no bad effects occur by the procedure.

All these are questions which concern the bacteriologist, and clinicians are looking to them for an explanation.

Generalisation of the Disease by means of Tuberculin.—The fear that tuberculin will cause generalisation of the disease has prevented many physicians from using it as a remedy. Of course dangerous symptoms may appear if tuberculin is used in a reckless manner, if the doses are too large or too rapidly increased, or if it is given to a patient suffering from a sapræmic condition caused by a mixed infection. This last condition is a very serious one, and in itself will cause symptoms of extreme exhaustion with a "swinging" and high temperature. If to this is added another reaction between the tuberculin and its antibodies, the serious state of the patient is only aggravated, but it does not prove that there has been any generalisation of the disease.

That generalisation does not occur has been demonstrated by Spengler, Rembold, Camac Wilkinson, Weicker, Krause, Petrusky, Moeller, and many others, who have used tuberculin systematically for many years. They have placed on record the fact that in no single instance have they found the disease become generalised by its use.

Camac Wilkinson, in his essay which gained the Weber-Parkes prize in 1909, states : "After an experience extending back for eighteen years, during which I have freely and openly used this test, I am ready to solemnly affirm that I have not yet seen a serious effect from the use of tuberculin as a diagnostic agent ;" and "Although my experience gives no support to the popular view that test doses of tuberculin may not be free from risk, I am willing to argue that the risk is not great enough to justify the condemnation of the method."

Diagnostic Value of Tuberculin.—The question as to whether tuberculin is an absolutely reliable test of the presence of some tubercular lesion is one which has exercised the attention of many who are seeking information before adopting the use of the remedy.

Von Pirquet's tuberculin test, though most useful, is uncertain. Calmette's ocular test with tuberculin often gives rise to unpleasant symptoms, and is also uncertain. But Koch's test by inoculation of old tuberculin is stated to be reliable on all occasions.

The investigations with cattle would alone tend to prove the value of the test. Cattle with no physical signs or indications of tuberculosis have been tested, and, when a positive reaction has been obtained, have been killed with the result that the disease has been discovered to be present. At Koch's Institute the test has been employed in many thousands of patients suffering from all varieties of disease, and in more than half of those giving positive results some form of tubercular disease has been definitely found.

If tuberculin gives a negative result, can we assume positively that active tuberculosis is absent? Koch lays down that two doses of 0·01 cc. of old tuberculin, given at proper intervals and showing no reaction, is proof positive of the absence of the disease. Even if this dictum is not accepted absolutely, yet it may fairly be acknowledged that the test cannot often give uncertain results.

On the other hand, if tuberculin gives a positive result, does that mean that a tuberculous lesion must be present? Here the proof rests on more uncertain ground. It is so difficult to prove that there is no hidden lesion that cannot be discovered by ordinary means. Would the injection of such a powerful poison ever give rise to a raised temperature with perhaps a modified indication of a reaction at the seat of inoculation if no tubercular lesion is present? I fear that there might be some cases which would raise doubts. One case occurred at this hospital when 0·001 cc. raised the temperature to 101° F., and there was slight redness at the seat of inoculation, yet the supposed tubercular ulcer which was present showed no indications of healing, though the injections were pushed to fairly large doses, while the ulcer healed immediately when anti-syphilitic remedies were employed. I am aware that even this is no proof, for the two diseases might have been present with the syphilitic poison causing the ulcer.

These isolated and rare cases, however, cannot take away the value of the test, since a positive result is obtained in nearly every case which can be proved to be tubercular by other means.

Meaning of a Reaction.—A reaction means a rise of temperature to 99·5 or above. There is swelling and redness around the site of the puncture and perhaps œdema. Sometimes there is headache and pain in the limbs, and sometimes even vomiting. A severe reaction sets in, in about three to five hours, but milder reactions

may not set in for twelve hours or even longer. As the fever is often of very short duration, it is advisable to take the temperature every four hours, or, better still, every three hours.

Method of administering Tuberculin. — There are several methods by which tuberculin can be administered:—

(1) By the mouth.

(2) By inunction.

(3) Hypodermically.

By the last method it may be given—

(*a*) In minute doses with or without control of the opsonic index, or (*b*) by the intensive method.

The method of administration by the mouth is recommended by Latham and others. It is a method that does not appeal to me, and I have no experience of it. Tuberculin is such a powerful remedy, and has to be given in such small quantities, that its use in this way does not seem to provide sufficient accuracy; and when exact dosage can be made by the simple hypodermic method, it seems undesirable to adopt any other. Further, the object of the administration is to produce antibodies, and it is fully recognised that all tissues do not produce these antibodies equally. It has been pointed out that when the antigen is introduced into the blood-stream, little or no antibody is produced. This can be demonstrated with the diphtheria toxin. Serous membranes are not suitable tissues for their production, while, when the antigen is introduced into the connective tissues, abundant antibodies are found. When the antigen is absorbed by the mucous membrane of the digestive tract, it becomes a matter of doubt what course it takes.

Many of these objections apply to the method of administration by inunction.

It has been frequently noted when tuberculin is given hypodermically that repeated small doses have the effect of prolonging the period of sensitiveness which is present in the majority of patients when a course of tuberculin is started, while this sensitiveness or over-sensitiveness rapidly disappears if the doses are gradually increased. Koch long ago recognised this phenomenon, and utilised it as a means of diagnosis of the presence of the disease. In his instructions he lays down that 0·1 cc. of old tuberculin should be injected, and if this gives no reaction, then the same dose should be repeated, for he found a repetition of small doses increased the sensitiveness of the patient to the preparation.

Many critics of the treatment by tuberculin fall into error over

this subject of "sensitiveness" which is induced by repeated use of small doses. These critics declare that they have tried tuberculin with their patients and have failed. In support of their argument they quote numerous instances of their want of success. But in answer it can be urged that they have only been using infinitesimal doses, 1/10,000 to 1/500 part of a milligramme, and it is the repetition of these doses which has brought about the failures. If, instead of these doses, they had begun with 2 milligrammes of P.T.O. and increased gradually to 500 or 1,000 milligrammes, then the sensitiveness would probably have been overcome, and quite different results would have been obtained. It is the "intensive" method of administration that I am anxious to advocate, not the administration of minute doses, which is acknowledged by so many to be a failure.

To calculate the dosage by means of the opsonic index is a method established by the great authority of Sir Almroth Wright, and has of recent years received much attention. It can hardly be considered to have achieved the excellent results that were anticipated.

Emery has pointed out that a high opsonic index does not necessarily imply that the local lesions are undergoing cure, and chronic tubercle, especially lupus of some standing, is often associated with a very high index.

Although many bacteriologists consider that the presence of opsonins is essential to produce beneficial results, yet this is by no means proved, nor is it certain that tuberculin will cause an increase in the amount. Again, the opsonic index is no indication of the presence of antibodies, if it is by these that immunity is obtained.

Pfeiffer, Friedberger, and a great number of authorities on the Continent do not consider a low index of any real importance.

Horder, of St. Bartholomew's Hospital, refers to the subject more forcibly, and states: "I regard the doctrine of the opsonic index as a great, almost the sole, artificial limitation to the use of vaccine therapy," and is of opinion that "that doctrine is the greatest incubus to our advance in knowledge of vaccine therapy." He considers that the "condition of the patient and not the state of the opsonic index is the real test of treatment."

It is becoming increasingly apparent that the dosage of tuberculin can be more readily gauged by clinical symptoms than by the opsonic index, which can only be estimated with difficulty, and is subject to unaccountable variations.

The main object of the method of administering tuberculin hypodermically by the intensive method is to secure immunity as rapidly as possible, and to secure this by increasing the amount of tuberculin, if possible, at each injection, the doses being calculated by the effect produced.

Hewlett states: "Old tuberculin, when injected into a healthy animal, produces no effect, but in a tuberculous animal one minute dose gives rise to a marked reaction, fever, swelling and tumefaction of the tubercular lesions. By cautiously increasing the amount a toleration is gradually induced, so that large doses cause little or no disturbance. Under certain conditions the injections produce marked changes in the tuberculous parts, leading to necrosis and exfoliation, with subsequent healthy reaction and repair; this is especially seen in cases of lupus. By continued injections a marvellous improvement results, so much so that a cure is apparently affected."

Nathan Raw, of Liverpool, is convinced that tuberculin has an excellent effect in tubercular peritonitis and genito-urinary tuberculosis.

Many physicians are now adopting this mode of treatment, but it is unnecessary to refer to them. That tuberculin gives beneficial results in suitable cases is no longer a matter of doubt, but is an established fact, provided large enough doses can be given.

Classification of Cases.—It has been found convenient to divide the cases into three classes :—

(1) Those which are infected only with the tubercle bacillus.

(2) Those which are infected with some other kind of bacteria, such as a *Streptococcus*, *Staphylococcus*, or *B. pyocyaneus*, &c., in addition to the tubercle bacillus.

(3) Those in which the lymphatic glands are chiefly infected.

The cases in Class (1) are those which yield almost invariably to the careful and systematic administration of tuberculin.

Class (2) is an aggravated condition of Class (1), and in these cases there is what is known as "mixed infection." It must not be forgotten that in these cases there are two distinct diseases running side by side—the tubercular infection and the streptococcal or other infection. The treatment of these cases by tuberculin before the more active infection is dealt with has brought the remedy into disrepute, and has made many physicians sceptical as to its value. To treat such cases with tuberculin would correspond with treating a clubfoot or a cleft palate during an attack, say, of scarlet

fever. When, however, the active infection has been subdued, then, and then only, can the insidious disease of tubercle be dealt with.

It is these cases, too, which, curiously enough, have brought sanatoria so much to the front, and in the following manner:—

A patient is infected with tubercle, and the progress of the disease is very slow, but nevertheless it progresses. At this stage, especially among the poorer classes, little notice is taken, and the patient battles against his feelings of weakness and continues his work. Gradually the lung tissues break down and "open tuberculosis" arises with the expectoration of the bacilli. By living in insanitary surroundings a mixed infection occurs. The man becomes seriously ill and obtains admission to a consumption hospital. In this hospital he is scientifically treated and carefully nursed, while his surroundings are healthy and he obtains complete rest. Under this treatment he recovers from his mixed infection, he is discharged from the hospital and sent to a sanatorium. In this institution he rapidly gains strength and weight, which have become greatly reduced on account of the second infection, and to all outward appearances he has recovered from his tubercular disease. Possibly his improved condition will so improve his vitality that the tubercular infection subsides and so-called spontaneous cure results, or graduated exercises have achieved a cure by auto-inoculation, but more generally the tubercular infection continues its slow progress. The results of the sanatorium treatment have been most excellent, but after the man has returned to his work, as so often occurs, his health begins to fail again, and all the good that has been done is lost. It is after the cure of the streptococcal or other infection that tuberculin becomes of value.

The third class of cases is more difficult to understand, and the treatment of them is not very satisfactory. In these cases the patient appears to be extraordinarily sensitive to tuberculin while the enlarged glands are present. If they are removed by operation the reactions are either absent or are very slight.

Selection of Cases for Tuberculin Treatment.—Acting on these principles the cases suitable for a course of tuberculin can often be readily selected. First, it must be proved that the patient is without doubt suffering from tuberculosis. Then before beginning the course the temperature should be taken at least three times a day for some days. From the character of the temperature chart it is generally possible to decide to which class the case belongs.

If the temperature remains normal morning and evening, the course of tuberculin should be commenced at once and pushed on rapidly.

If the temperature only rises in the evening to 98 8, 99, or even 100, the fever may be due solely to the tubercular infection, and tuberculin can be commenced and pushed on slowly and cautiously. It will often be found that the evening temperature will gradually subside.

If the temperature takes on a "swinging" character, viz: subnormal in the morning, and 100, 101, 102, or even higher in the evening, it may be considered that in addition to the tubercular infection there is a streptococcal or other infection of importance. Then the former should be left severely alone while the latter is vigorously attacked. When the second infection has ceased to be evident, then is the time for the tuberculin course to be commenced.

Method of dealing with a Streptococcal or other Infection.—In the case of mixed infections the treatment is difficult and disappointing, and attempts have been made, and are being carried out at this hospital, with the assistance of Major Dansey Browning, Captain Rose, and Lieutenant Benson, to effect a cure of this rapid and dangerous form of disease by other means than by the use of tuberculin.

Open-air treatment has often an extraordinary effect for good in these cases. The improvement often sets in at once. Complete rest is essential. Antiseptic inhalations are of benefit.

I am under the impression that patients seldom die of tubercle alone. When the tubercle bacilli have damaged the lung, then the development of a mixed infection rapidly kills the patient, and if the sapræmia caused by the mixed infection can be overcome, it will be found that the patient is not, in the majority of instances, in a hopeless condition.

There is one case in hospital here which has been for over a year bedridden and in a dying condition with mixed infection. Open-air methods and other measures have in some way overcome the second infection, leaving the lungs certainly in a terrible condition, yet the man is advancing rapidly under the tuberculin treatment, and is daily gaining strength. Vaccines are being prepared to overcome the secondary infection.

The employment of a polyvalent antistreptococcus vaccine or of a mixed antistaphylococcus vaccine gave in some cases indications of satisfactory results. Hence, samples of the patient's sputum (obtained

after careful disinfection of the mouth) have been cultivated and vaccines prepared. This method of dealing with the cases is still in progress, and we confidently hope it will lead to beneficial results.

Selection of the Preparation.—There are many preparations of tuberculin, all of which have proved of value at various stages of the disease.

Camac Wilkinson, whose experience with the different preparations is very great and valuable, has concluded that P.T. is useful in all stages, and "a previous course of the milder remedy P.T.O. is very useful, because this preparation is borne so well."

Accordingly P.T.O. and P.T. have been used at this hospital, and the results fully justify Camac Wilkinson's opinion.

It might be urged that since the patients are affected with the human bacilli, it would be better to use tuberculin prepared from this instead of the bovine variety. I can give no answer to this, except that the disease does respond to this remedy, and I must appeal to bacteriologists to explain the clinical fact.

It has been suggested that since bovine tuberculin is of benefit in human tuberculosis, the human tuberculin might give good results in bovine disease. The class of case in which bovine disease might be expected would be that in which the glands are principally affected, and in these cases perhaps T.R. would act in a more satisfactory manner than P.T. The suggestion is well worthy of consideration.

Difference between P.T.O. and P.T.—P.T. is P.T.O. which has been reduced to one-tenth of its bulk. It is theoretically ten times as strong. But there is a greater difference. The manufacture of P.T.O. consists in the cultivation of the virulent bacilli of the bovine type in nutrient broth. A glycerin extract is then prepared. To manufacture P.T. the broth is heated in a partial vacuum (so as to avoid high temperature) and evaporated to one-tenth its bulk. An extract is then prepared. By this process not only are the toxins extracted, but also other substances, the endotoxins.

Routine Treatment.

In order that the treatment may be carried out in a systematic manner, it is necessary that certain rules should be formulated to act as guides. At this hospital a routine has been laid down, but it must be understood that this is subject to variation, for each case must necessarily be treated on its own merits.

Measurement of the Doses.—An ordinary Wright's pipette capable of holding $\frac{1}{10}$ cc. is required.

The tube is filled and a mark made to indicate $\frac{1}{10}$ cc. The space in this tube is then divided by marks into ten equal parts, in such a way that each space will contain $\frac{1}{100}$ cc.

Each mark will then equal $\frac{1}{100}$ cc., or 0·01.

When smaller doses are required a dilute solution is prepared.

With Old T. a solution of 1 in 10 is prepared, taking one part of pure Old T. and 9 parts of normal saline, containing ½ per cent. carbolic acid.

With P.T.O. a solution of 1 in 5 is prepared with 1 part of pure P.T.O. and 4 parts of normal saline solution, containing ½ per cent. carbolic acid.

Then with the 1 in 10 solution, one mark would represent 1/1000 cc. or 0·001, *i.e.*, 1/10 of a tenth of a cubic centimetre of a 1 in 10 solution.

(1/10 × 1/10 × 1/10 — 1/1000 — 0·001.)

Hence 5 marks would represent 0·005.

(5/10 × 1/10 × 1/10 — 5/1000 - 0·005.)

Again, with the 1 in 5 solution, one mark would represent 0·002.

(1/10 × 1/10 × 1/5 = 1/500 = 0·002.)

Table for Easy Reference.

A table for easy reference has been compiled, and is hung up in the room where the injections are carried out.

Old T. (for diagnosis). (1 in 10 solution.)		P.T.O. (1 in 5 solution.)	
1 mark — 1/1000	— 0·001	1 mark	— 0·002
5 marks — 5/1000	— 0·005	2 marks	— 0·004
10 marks — 1/100	— 0·01	3 marks	0·006
		4 marks	— 0·008
		5 marks	— 0·01
		6 marks	— 0·012
		7 marks	— 0·014
		8 marks	— 0·016
		9 marks	— 0·018
		10 marks	— 0·02

P.T.O. or P.T. (pure).			
Half a mark	— 0·005	10 marks — 1/10 cc. ..	— 0·1
1 mark	— 0·01	1/10 plus 1 mark	— 0·11
1½ marks	— 0·015	1/10 plus 2 marks	— 0·12
2 marks	— 0·02	1/10 plus 5 marks	— 0·15
3 marks	— 0·03	1/10 plus 8 marks	— 0·18
4 marks	— 0·04	2/10	— 0·2
5 marks	— 0·05	3/10	— 0·3
6 marks	— 0·06	5/10	— 0·5
7 marks	— 0·07	7/10	— 0·7
8 marks	— 0 08	10/10	— 1 0 cc.
9 marks	— 0·09		

Diagnostic Test by Tuberculin.—Old T. is the best preparation to employ for diagnostic purposes.

Take one mark of the 1/10 solution of Old T., *i.e.*, 0·001, dilute this with a few drops of saline solution, and inject it into the arm hypodermically.

This test should not be given to patients with a raised temperature, for a temperature above normal will mask the test.

For feeble patients or for children, 1/10 of this dose should be used.

If there is no reaction, inject five times the amount, *i.e.*, 0·005, on the third day after, leaving two days clear. If there is then no reaction, inject ·01 after two clear days.

If no reaction is obtained by this procedure it may be assumed in the majority of cases that there is no active tubercle present.

Position of the Injections.—The most convenient position for the curative injections is in the side, where a large fold of skin can be readily raised, but for the diagnostic injections of Old T. the arm is more suitable, as the reaction at the seat of the injection can be more readily seen.

Method of Giving the Injections.—The syringe should always be boiled, and after the injection it should be rinsed in sterilised water, then in absolute alcohol, and finally in sterilised water again.

When giving injections to case after case, it is not necessary to boil the syringe each time, but only the needle.

The skin of the patient at the place of injection should be thoroughly rubbed with a piece of cotton wool soaked in methylated spirit until the skin is reddened. This is to cleanse the skin at the part where the injection is to be made.

Dosage of P.T.O.—The strength of the first dose of P.T.O. should be 0·002. After the amount has been measured out, it should be diluted before injection, with a few drops of saline solution. After this the dose should be, as a rule, half as much again (though Koch doubles the dose). But if the patient is very sensitive and the fever continues, the increase should be more gradual, but not less than one-fifth more. If the reaction produces a temperature of 100°, the next dose should be the same, and the same dose may be repeated three or four times if the temperature still remains at 100° or above. If the reaction causes a still higher temperature the dose may even be lessened.

This has been the rule, but I am inclined to modify it to the following: If the temperature reaches 100° or above, the next dose should be delayed, but always increased by one-eighth to one-fifth in amount.

Dosage of P.T.—If P.T. were given at first the reactions produced would be very violent. Therefore a preliminary course of P.T.O. is necessary. When 0·5 P.T.O. or more has been reached, then P.T. should be started.

Owing to the presence of endotoxin, 1 cc. of P.T.O. does not correspond to one-tenth cc. of P.T. Hence the initial dose of P.T. must be reduced to one-fiftieth of the amount of P.T.O. last given.

If 1 cc. of P.T.O. is reached, then the next dose would be 0·02 P.T.; or if 0·5 P.T.O. is reached, then the next dose of P.T. would be 0·01.

The doses are increased in the same way with P.T.O. until about 0·7 P.T. is reached if there are no reactions, or 1 cc. if the remedy causes a reaction.

Interval between the Doses.—As a rule there should be an interval of two clear days between the doses. That is, if the injection is given on the first day of the month, the next dose is given on the fourth day of the month.

If the injection causes a temperature of 99·5°, then one day more should be added to the interval; if 100°, two days more; if 100·5°, three days more, and so on. It is rarely necessary to wait more than eight days.

If for any reason the injections are suspended for 14 days, it is advisable to give a reduced dose for the next injection.

If the injections have been suspended for a month, the dose should be one-fifth of the last dose.

Maximum Dose of P.T.—Koch lays down with his Old T. that a cure may be regarded as attained when the dose has reached ·5 cc., but even higher doses may be given after the fundamental immunity has been established.

Camac Wilkinson recommends that the maximum dose to a full-sized adult should be 1 cc. P.T. The maximum dose, however, may be calculated by the effect on the patient.

Meaning of the Term "A Course of Tuberculin."—It is difficult to lay down any hard and fast rules as to the length of a course, or as to the amount of the dose that should be reached, for so much depends on the condition of the patient.

With regard to P.T. and P.T.O. the following has been used as a rough guide at this hospital.

A course may be considered to be complete when increasing doses of P.T.O. from 0·002 to about 0·5 have been given, followed by increasing doses of P.T. from .0·01 to 0·5, provided the last twelve

injections have produced no sign of a reaction. If, however, these injections have caused a reaction, then the doses should be continued until 1 cc. is reached, or until there have been twelve injections free from reaction.

It does not follow that when the course is over the patients should not be kept under observation. It is always necessary to test him with 0·001, 0·005, and 0·01 Old T. three or four months afterwards to see if any bacilli, which might have been cut off from the circulation by any cause, have started a fresh focus of the disease. Should these doses react it would be necessary to give a further, though modified, course again.

Further, it is desirable that the patient should be tested once a year after this for two or three years for the same reason.

The higher doses must be reached before the course is complete, as if they are not the disease is liable to return. Hewlett, when referring to the beneficial use of tuberculin in lupus, states that "unfortunately when the tuberculin treatment is discontinued, the scar usually breaks down and the disease returns. Nevertheless a few cases have remained permanently cured." An explanation in the case of the failures might be that the higher doses of tuberculin were not reached, and in the case of those that did not recur, that the maximum dose for the particular cases had been reached.

Indications that the Tuberculin is Acting in a Satisfactory Manner.—There are two principal indications to show that the tuberculin is acting in a satisfactory manner—namely, the character of the temperature chart and the weight of the patient. Hence the necessity for keeping an accurate record of the temperature and weight.

The dosage of tuberculin which appears to give the most satisfactory results is that which is sufficiently large to produce a slight reaction. If twelve or twenty-four hours after the inoculation the temperature rises to 99° or 100° and then falls in a few hours to normal, remaining normal until the action of the next dose, this is quite favourable. In a great number of cases no reactions occur after a series of slight reactions. This, of course, is the most favourable sign.

A gradual increase in the weight of the patient is an indication of progress towards recovery. If there is loss of weight, and the loss is undoubtedly due to the amount of dose, then the dosage must be carefully watched. At the beginning of a course there is generally a loss of one to two pounds, but after a short time there is generally a gain in weight.

Keeping Qualities of Tuberculin.—Pure tuberculin theoretically wil keep for any length of time. If diluted to the extent of 1 in 10 its keeping qualities are lessened, but still this solution will keep for a considerable time. More dilute solutions will only keep a short time. It is therefore desirable when purchasing diluted tuberculin from manufacturing druggists to be quite sure of the freshness of the material. Should the solution become turbid, it is not suitable for injection.

Special Advantage of Tuberculin Treatment.—The great advantage of this method of treatment is that the patients can often continue their work while the treatment is being carried out. Of course the advantages of sanatoria are recognized, but only a limited number can be admitted to them. Other patients would gladly be admitted, only perhaps a wife and family have to be provided for, or admission would mean the loss of a good situation which might never be regained. If these patients could be successfully treated with tuberculin, and at the same time carry on their work, then the system I am now advocating would become of immense value. The majority of cases we have had under treatment here either have or could have carried on their work very soon after the inoculation had been started.

Results of the Treatment.

The tuberculin treatment has been systematically carried out at this hospital for the last seven months, and 34 cases have come under observation. Most of them have been treated as out-patients. The time is too short to show the final effect of the treatment, but I hope to present to you some patients whose condition will indicate that the treatment they have undergone, and are undergoing, has been beneficial. In no case can it be said that the treatment has been a failure, though in some of the severer cases the progress has been very slow. There have been a few patients in whom the disease was in its last stages, and with them tuberculin was unsuitable and was not employed.

Case 1.—Idiopathic pleurisy of right side with early signs of tubercle of right apex. No Tb. in sputum. Test reacted. Course lasted 98 days. He was able to do a full day's work as a photographer three weeks after the commencement of the course. There is now no sign of the disease. He looks and feels perfectly well.

Case 2.—Idiopathic pleurisy of left side. No definite signs of tubercle, but his chest was full of moist sounds. He was very breathless, emaciated, and feeble. Test reacted. Course lasted

90 days. He returned to his duty as regimental boot-maker a fortnight after the commencement of his course, feeling well. In a month he was able to bicycle long distances. He has remained in perfect health.

Case 3.—Left apex, first stage. Test reacted. Course lasted 96 days. Was able to do his full work a fortnight after the commencement of treatment. No signs of the disease now, and he is feeling well.

Case 4.—Tubercular glands of neck removed by operation. Test reacted. Course lasted 71 days. Returned to duty ten days after the commencement of the course, and has been perfectly well since.

Case 5.—Idiopathic pleurisy with effusion. Aspiration. Test did not react. This proves that every case of idiopathic pleurisy is not due to tubercle.

Case 6.—Ganglionic teno-synovitis. Operation. Persistent ulceration. Test reacted. The course was continued for 61 days, but improvement did not take place. Possible syphilitic taint. Ulcer healed after anti-syphilitic remedies.

Case 7.—Pleurisy of left side with signs of a greatly thickened pleura. Right apex, commencing second stage. No Tb. in sputum. Marked reaction to test. Course lasted 127 days. At first he was very feeble, but he soon was able to do his work, and at the end of the course all signs of thickened pleura had disappeared, and only slight signs of disease, about a square inch in size, were found at the apex.

Case 8.—Bronchitis. Hæmoptysis, right apex, first stage. Nervous symptoms. No Tb. in sputum. Test reacted. Course lasted 105 days, but was not completed. Greatly improved in health, and is now on furlough.

Case 9.—Lupus of right cheek for twenty-five years. Course was continued for 81 days and the patient is still under treatment. Patch greatly reduced in size. Several large "islands" of healthy skin. No ulceration. Patch looks healthy and is rapidly recovering.

Case 10.—Tubercular disease of kidney. Right apex, first stage. Has been under treatment for 15 days. Improved. Urine now free from albumin.

Case 11.—Right apex, second stage. Been ill for 3 years. Tb. in sputum. Has been under treatment for 105 days (still under treatment). Remarkable improvement. Has been doing his work as a clerk throughout the course. Feels "as if nothing was the matter with him." At present very few Tb., and these beaded.

Case 12.—Tuberculous masses in both sterno-mastoid muscles. Operation of scraping. Test reacted. Course was continued 151 days, the patient being treated as an out-patient. Much improved in general health. Ulcer on one side not yet healed.

Case 13.—Treated in a consumption hospital and at a sanatorium. Left apex, commencing third stage. Tb. in sputum. Course has contiuued for 138 days (still under treatment as an out-patient). Great improvement. Able to continue his work as a gardener.

Case 14.—Invalided from the Navy. Hæmoptysis; both apices, second stage. Course has continued for 24 days. Indication of improvement.

Case 15.—Invalided from India for tubercle of lung. Tb. in sputum. Both apices in second stage. Course has continued for 52 days. Still under treatment as an out-patient. Less breathless. Great improvement. Tb. very scanty.

Case 16.—Right apex, second stage. Tb. in sputum. Course commenced 12 days ago.

Case 17.—Right apex, second stage. Been ill for a year. Course commenced 11 days ago.

Case 18.—Far advanced in third stage. Been under treatment for a very long time. Mixed infection automatically cured in about a year. Course commenced 56 days ago. Progress remarkable.

Case 19.—Apices of both lungs, second stage. Severe mixed infection. Under treatment with vaccines.

Case 20.—Treated in consumption hospital and at a sanatorium. Much improved in latter place, but broke down soon after. Complicated with pneumothorax. Right apex, second stage. Left side, second stage. Course continued for 89 days. Great improvement.

Case 21.—Right apex, second stage. Pneumonia of right base. Tb. in sputum. Course continued for 47 days. Still under treatment. Almost all signs of disease have disappeared. Remarkable improvement. Now no Tb. in sputum.

Case 22.—Double pneumonia. Tb. in sputum. Course commenced 13 days ago.

Case 23.—Both lungs, late second stage. Mixed infection. Being treated with vaccines.

Case 24.—Both lungs, third stage. Mixed infection; *B. pyocyaneus*. Ulceration of bowels. Hopeless case from the first. Died. Was not treated with tuberculin.

Case 25.—Right apex, second stage. Hæmoptysis. Tb. in sputum. Course continued 47 days. Still under treatment. Remarkable improvement.

Case 26.—Right apex, second stage. Profuse hæmoptysis. Tb. profuse. Course continued for 44 days. Still under treatment. Remarkable improvement. Tb. now present in moderate quantity.

Case 27.—Left apex, second stage. Hæmoptysis. Tb. in sputum. Course continued for 118 days. Still under treatment. Signs of disease disappearing. Now no Tb. in sputum. Looks and feels well.

Case 28.—Right apex, second stage. Tb. in sputum. Course continued for 114 days. Still under treatment. Remarkable improvement. Increasing rapidly in weight. Looks and feels well. At present Tb. scanty and beaded.

Case 29.—Left apex, second stage. Tb. in sputum. Diarrhœa. Course commenced 10 days ago.

Case 30.—Right apex, second stage. Tb. in sputum. Course continued for 35 days. Still under treatment. Great improvement.

Case 31.—Synovitis of left knee of long duration—apparently of tubercular nature. Did not react to test.

Case 32.—Treated in two sanatoria. Been ill for many years. Right apex, second stage. Still under treatment. Much improved.

Case 33.—Tuberculous glands of neck. Course was commenced, but after a time was discontinued, as the reactions were too violent. No marked improvement.

Case 34.—Tuberculous disease in the lumbar region, either of the bones or the tissues situated near the bones. The boy was aspirated twice for a large collection of fluid, and finally the skin gave way, leading to a large ulceration with copious discharge. The test reacted. Still under treatment. The effect of the injections has been extraordinary, and there is now very little discharge.

MALARIA IN KASSALA, 1909.

By Captain W. BYAM.
Royal Army Medical Corps.

The "fever" season in Kassala extends from August 1st to December 31st. Primary infections with malaria were this year, however, probably limited to September and October. During August prophylactic measures were in full swing, and during the last two months of the year the results of these measures could be observed.

The prophylactic scheme put into force was as follows :—

A.—Personal Prophylaxis.

(1) The first bi-weekly issue of quinine was made to the Egyptian troops on July 22nd and to the Arab troops on September 7th.

(2) Putties and boots were worn regularly after sundown by the Egyptian troops during the four months August to November inclusive, and as a result very few men were seen with mosquito bites on their legs. This precautionary measure may therefore be considered of value.

(3) Mosquito nets were put up by the Egyptian troops on September 9th, and by the Arab troops on September 16th. No mosquitoes had been observed previously in Kassala, so I did not wish to prejudice the troops against sleeping in mosquito nets by enforcing their use for no apparent reason. The nights during September were quite cool, and no difficulty was experienced in making the men sleep within their nets. Owing to the frequent rainstorms at night, and the fact that accommodation was ample, no men slept outside their barrack-rooms. Considerable difficulty, however, arose in making the men keep their nets clean and in a proper state of repair.

During the Fast of Ramadan men were obliged to be outside their nets for some portion of the night in order to get their food. The Ramadan Fast this year extended from September 15th to October 14th, and it was during the latter month that the majority of cases of malaria were admitted to hospital. It must be added, however, that mosquitoes were probably most prevalent at this time also.

By means of the mosquito nets one realised to what an extent the barracks in Kassala are infested with bugs. Any morning on inspecting a net it was possible to find colonies of bugs, in a gorged condition, hidden in the four upper corners, and this in spite of

repeated attempts to destroy vermin in barracks. All mosquito nets were at intervals immersed in boiling water to free them from bugs, and this no doubt led to considerable damage to the nets; but sunlight and other less drastic measures were of no avail.

Bi-weekly quinine parades (10 grains on two successive days) were continued until December 2nd, from which date all prophylactic measures ceased, no mosquitoes having been seen in barracks during the previous month. The after-treatment of infected individuals was rigidly carried out. In addition to a nominal roll of all men admitted to hospital for malaria a book in the form of a diary was kept, in which, on discharge from hospital, each man's name was entered on all the days on which he should subsequently take quinine. It was the duty of the officer superintending the giving of quinine to these men to place his initials against the name of each man as he took his dose, and this diary was placed on my office table each morning for inspection. When the regimental quinine parades ceased on December 2nd, all men on the malaria roll were required to attend once a week at the hospital, where they received an intramuscular injection of quinine bisulphate, 10 grains, and were examined. This practice is still being continued.

B.—Domestic and General Precautionary Measures.

(1) *Parade and Toolba Scheme.*—It was found that if the Egyptian troops worked in the sun between 11 a.m. and 3.30 p.m. large numbers reported sick, complaining of headache, and with varying degrees of pyrexia. For this reason all Toolbas were dismissed an hour earlier than laid down in orders. The men who reported sick were by no means only those previously infected with malaria, and a dose of calomel usually proved efficient treatment for them.

No work was carried out this year by the troops in the irrigated area, a practice which, I think, must have caused a considerable amount of sickness in 1908, towards the end of the year, as during November, 1907, the daily average percentage of Egyptian troops in hospital was 9·91, and in November, 1908, 27·03, whereas the percentage for the two years in October was very similar—viz., 12·46 and 14·74.

Towards evening the pools on the cultivated land proved a great attraction to the troops, who, whenever possible, wandered off and sat washing themselves and their clothes in the stagnant water within what might distinctly be regarded as the "danger zone." Stringent orders were published forbidding men to go near the

cultivation, and as far as possible all troops were marched down to the River Gash each week for a bathing parade; suitable bathing and washing accommodation I consider is urgently required in the barracks. Water is plentiful in the wells in barracks, but it is necessary to prevent men from washing around them in order to keep the drinking water-supply as pure as possible. The only existing wash-house, belonging to the Artillery, had to be pulled down, as it had become so insanitary.

(2) *Mosquito-breeding Prevention.* — The drainage scheme in Kassala has probably done more to reduce the number of mosquitoes in the town this year than any other precautionary measure. The funds available will probably be sufficient to complete it, but unless many of the drains are properly fenced in the amount of labour required for their upkeep during the rains will be very large.

During the past month I have been able to complete a scheme for the drainage of a large area of waste ground between the official portion of the town and the River Gash. A series of channels were cut through this area, with a good fall towards the river, and all hollows raised sufficiently in level to drain into them. The work has been carried out by means of the balance of the £E100 granted for work in the civil portion of the town. Many breeding-grounds were found in this area during September and October. All drains will require to be cleared of sand shortly before the next rainy season commences, as I understand that the greater number of them become nearly full with drifting sand during the dry weather. The moat round the Fort was raised in level in August last and made to drain into a neighbouring channel.

I think it would be a great mistake to fill this moat completely, as it is required to carry away the water that passes into it from the interior of the Fort—a by no means inconsiderable amount—and that caught by the sloping ramparts. The ground all round, which is in places swampy, might easily be made to drain into it also. As existing at present, however, the moat is not a good drain, being broad and shallow. The fact that no grass grew last season was probably the result of loose earth having been recently thrown into it, and, being porous, the surface dried too soon to allow seed to germinate. When, however, the ground settles and becomes compact I feel sure that it will remain sodden after rain and that grass will spring up. Little trouble may be caused next season in this way, but it is bound to increase year by year. To prevent this happening, the actual drainage channel of the moat should be narrowed and faced with stone (dry pitching).

In this way it would provide efficient drainage for the Fort and a large area round it.

A lecture dealing with mosquitoes and malaria prevention was delivered on August 14th by Yousbashi Asad Eff Malouf in the Technical School, Kassala; 136 persons attended, including the more important civilian inhabitants, and much information was imparted to them.

The objects of this lecture were (*a*) to try and induce the people of the town to keep their houses and enclosures free of mosquito-breeding grounds; and (*b*), which I consider even more important, to explain to the people why their houses would be so frequently visited and their privacy intruded upon. Though I entered nearly every house and tukl in Kassala during the rains, I never met with any obstruction, and this I attribute in part at least to this lecture.

Mosquito brigades were instituted for both the military and civil areas on July 31st. The military brigade consisted of one non-commissioned officer and three men of the 4th Battalion, one man of the Artillery, and two men of the Arab Battalion. They practically formed a sanitary squad, and were of far more use in destroying breeding grounds than in finding them. The civil portion of the town was divided as follows: (1) Southern native quarter, or Mareneyeh; (2) northern native quarter, or Halenga; (3) Suk, central portion of town; (4) official quarter, central portion of town; (5) native quarter, to west of River Gash.

Nos. 1, 2, and 5 were inspected by their respective sheikhs, who were paid from the Kassala Sanitary Fund, after receiving adequate instruction; No. 3 was in charge of the Medical Officer in charge of the Civil Hospital, and No. 4 I personally looked after. All quarters were periodically inspected by myself.

In addition, large areas about the town fell into none of these districts, being undeveloped; and it was in these areas that many mosquito haunts existed. To deal with these, a headman and thirty labourers were employed daily, being paid for out of the special civil grant. When breeding-grounds were discovered, they were rapidly cleared of all vegetation and the ground around freed of trees or bushes. The remaining water was oiled to destroy larvæ, and finally sufficient earth was thrown into the depressions to absorb all moisture. Depressions were not filled, as only emergency measures were undertaken. The civil prisoners did much valuable work of a more permanent nature in the way of levelling.

Domestic hygiene was satisfactory in all but the central portion of the town—that portion of the town situated nearest to the

military quarter. In this, the Kara quarter, at least 50 per cent. of the houses are uninhabited, and their grounds contained, and in many cases still contain, open wells, pits, and rank vegetation. Orders were published directing owners to deal with these matters but with far from satisfactory results. In some cases owners were not forthcoming, and in others they took no notice of the orders. As many as possible of these compounds were therefore dealt with by the civil mosquito gang, and an attempt is being made to recover the cost of this work.

The question of these houses is a very difficult and important one. They were mostly built at the time when irrigation was instituted around Kassala, their owners hoping for an increase of the population, which did not result. A period of depression has followed, and in many cases the owners cannot afford to improve the condition of their property; at the same time it is considered unwise to fine these people, to enforce the regulations, or to "confiscate" their lands. I can only suggest that the practice employed during the past season should be continued.

The irrigation of land round Kassala is stated by most of the inhabitants to be the cause of the recent great increase of malaria. Careful inspections were therefore made of the water on the land, and larvæ of Culex and Anopheles proved to be present on September 16th in such a position as to be dangerous to the troops.

The most important breeding-grounds were depressions just within the banks enclosing the irrigation areas, from which earth had been taken to build these banks. Water drained into these depressions as the land began to dry up, and as they were not cleared for purposes of cultivation the vegetation in them became very rank. Long stretches of these depressions to the east of the barracks were consequently cleared and the water in them oiled. In addition, two hand pumps were lent to me by the Sudan Irrigation Department, with which an attempt was made to pump the water on to the dry ground outside the irrigation area, where it quickly evaporated. To attempt to empty these pits with pumps such as were available was a hopeless task, and not worth repeating next season.

Paraffin oil on the smaller pools proved very satisfactory, but where the surface of the water was extensive and much exposed to wind it did little good. In such areas it was found better to apply oil before vegetation had been removed, and where no vegetation existed to cut down neighbouring bushes and throw them or their

branches into the water, in order to prevent the oil from being blown to one side.

The mosquitoes subsequently seen in the barracks came, I believe, almost entirely from the irrigated land. They easily passed to the Arab Battalion lines, 400 yards distant, and thence, through a population highly infected with malaria (spleen count, 61·8 per cent.), to the adjacent barracks of the Egyptian troops.

Grass cutting was carried out around the barracks by toolbas, each unit being allotted its special area. During the worst of the rains no great difficulty was experienced in coping with the grass by hand; the Egyptians quite outclassed the Arabs at this work, but from the end of September onwards, as the heat became greater, the area to be cleared proved quite unmanageable with the labour available. The civil mosquito gang were employed to work right up to the military boundary, but even then the grass got the upper hand in places.

By the time, however, that the growth of grass is most rapid the ground is becoming firm, and it would, I think, be possible to cut it with a mule-drawn reaper.

All cut grass was burnt as soon as possible, as otherwise it rotted and bred flies. The existing rubbish-destructors in Kassala would have been most useful for this purpose had they then been available.

General sanitation has received special attention with the idea of its being part of an anti-malarial campaign; the outstanding feature in Kassala in this respect is the bad state of the public latrines. Sleeping accommodation throughout the barracks was ample.

Spleen Index.—In order to determine the effect of the various mosquito-breeding areas on the population of Kassala, an attempt was made to estimate the percentage of enlarged spleens among the children of various districts between the ages of two and ten years. The figures obtained were as follows:—

District	Children examined	Enlarged spleens	Percentage
Arab Batt.	18	11	61·1
Sheikh Taib Shenaina's Vill. ..	17	13	76·4
Halenga Central	21	10	47·6
,, South	25	7	28·0
Kara	33	13	39·3
Maraneyeh	55	23	41·8
Khatima	4	2	50·0
Gharb-el-Gash	5	0	0
Total ..	178	79	44·38 %

The number of children examined is small, and from two districts, Gharb-el-Gash and Khatima, inconsiderable; but it was impossible to obtain more, as at this season of the year so many children are away from the town working in the fields. Also the children examined were nearly all boys, as the small girls were either too frightened to put in an appearance at all, or wept so when forthcoming that no reliable results could be obtained. It will be noticed, however, without exception that the nearer an area is to the cultivated land the higher the spleen index.

Difference of race can in no way account for the different percentages, as people of the same tribe live in Halenga South and in Sheikh Taib Shenaina's villages. The former, with 28 per cent., is in the centre of Kassala, far from the cultivation, whereas the irrigated land comes to within 46 yards of Sheikh Taib Shenaina's village (spleen rate, 76·4 per cent.). The Arab battalion (61·1 per cent.) has irrigated land 400 yards away to the east, a direction from which the wind often blows while mosquitoes are prevalent.

Results.—During the five months August to December, 1909, inclusive, there were: Twenty-seven admissions to hospital for malaria; one re-admission to hospital; one death from malaria; two invalids to Cairo; 247 days spent in hospital by men suffering from malaria, 9·14 days being the average stay of each patient, and 34 days being the longest time spent in hospital by any one patient.

The units from which these men came are as follows: 4th Battalion, twenty-one men; Arab Battalion, two men; Artillery, four men; Medical Corps, none.

Of these, seven men were admitted to hospital for malaria during 1908, as shown by their medical history sheets; no documentary evidence could be obtained concerning three men: leaving seventeen cases who undoubtedly contracted malaria during 1909. The man who died was admitted twice for malaria during 1908. The attack from which he died was of the cerebral type and lasted for five days. Quinine injections up to 60 grains were given each day, but produced no effect. The man re-admitted for malaria was eventually invalided to Cairo, chiefly on account of debility, but was at the time making a rapid recovery on a course of fresh lime-juice. Fresh lime-juice I found of more value in cases of debility after malaria than arsenic or any other tonic.

One case originally diagnosed malaria eventually turned out to be a case of liver abscess.

The cases were all of the benign tertiary type and reacted

readily to quinine. As stated in my annual intermediate report, the giving of quinine to the troops in July and August distinctly improved their general health. The percentage of admissions of Egyptian troops, which was 7·82 for June and 9·13 for July, fell to 4·31 for August and 4·45 for September. This was with an increasing rainfall, but before any fresh infections with malaria could have occurred.

Comparison with Previous Years.—Attached are three charts showing the daily average in percentages of sick in hospital by weeks for the Egyptian Battalion and Arab Battalion during the five months of August to December 1907, 1908, and 1909. These are the totals in hospital, and not merely men sick from malaria; but the seasonal variation is due practically to malaria alone, and may be taken as a correct estimate of the sickness due to that disease.

For the Egyptian Battalion the highest weekly average during—

1907 was 19·5 per cent. for week ending September 25th.
1908 ,, 31·5 ,, ,, ,, November 27th.
1909 ,, 3·2 ,, ,, ,, ,, ,,

Only during one week in 1909 did the numbers average 3 per cent. or more.

In the intermediate annual medical report of the Egyptian Army for 1909 the percentage constantly sick is returned as 2·91 for the whole army during twelve months, the total admissions for malaria during twelve months in Kassala as 1,184, the total cases of malaria for the whole army being 1,638.

In Kassala, during twelve weeks in 1908, the average in hospital was above 9 per cent., and for three weeks it remained above 31 per cent. During twelve weeks in 1907 the average in hospital was above 9 per cent.

Totals are of no value, as the numbers of the garrison varied greatly each year. For the Arab Battalion the sick in hospital averaged much the same each year, though only two men were admitted for malaria during 1909.

The highest weekly average in—

1907 was 7·5 per cent.
1908 ,, 4·75 ,,
1909 ,, 7·2 ,,

The somewhat high average during 1909 was almost entirely due to venereal disease, the result of the present system of inspection.

In the Civil Hospital, Kassala, thirty-five patients were admitted for malaria during the fever period of 1908, and two patients were admitted during the same period of 1909.

The meteorological report shows the total rainfall for 1909 to be 22·7 mm. in excess of the total for 1908, but 69·5 mm. less than the total for 1907. During 1909 the rain was fairly evenly distributed between July, August, September. Very little rain fell in August, 1908.

Months	Temperature			Wind	Rainfall		Remarks
	Shade maximum	Shade minimum	Mean	General direction	Amount of mm.	Number of rainy days	
1907							
July ..	104·9	61·7	82·4	S.	127·7	..	Total rainfall,
August ..	95·9	66·2	79·9	S.	234·5	..	404·7 mm.
September ..	103·1	67·1	84·6	S.	34·0	..	
October ..	104·0	67·1	87·1	S.E.	4·0	..	
November ..	103·1	58·1	83·1	N.N.E.	0	..	
December ..	97·7	55·4	78·4	N.E.	0	..	
1908							
July ..	99·6	73·4	84·9	S.	152·0	..	Total rainfall,
August ..	98·6	67·1	82·9	S.	7·0	..	312·5 mm.
September ..	100·4	66·2	82·9	S.S.E.	132·3	..	
October ..	103·6	66·2	92·2	S.S.E.	2·0	..	
November ..	100·8	55·4	73·4	N.E.	0	..	
December ..	90·5	55·4	75·2	N.N.E.	0	..	
1909							
July ..	98·6	65·3	87·8	S.	90·5	7	Total rainfall,
August ..	98·6	67·1	81·1	S.	91·0	9	335·2 mm.
September ..	103·1	65·3	82·8	S.	70·2	7	
October .	104·0	69 8	87·8	S.E.	3·0	1	Direction of wind different almost every day in October
November ..	102·2	65·3	85·2	E.N.E.	0	0	
December ..	98·6	47·3	77·0	N.N.E.	0	0	

During 1907 more than half the total rain fell in August, and very little in September. Very little rain fell in either of the three years during October.

The wind during September and October of each year blew mostly from the south and east—that is, during the time that mosquitoes are in greatest numbers, and from the nearest irrigated land towards the barracks.

Causes of Improvement.—I consider that the following are the chief causes of improvement in the general health of Kassala during the past rains, arranged in order of their importance:—

(1) The present drainage system.
(2) The quinine prophylaxis employed.
(3) The organised mosquito destruction.

(4) The sending away of all sickly men from Kassala before the rains.

(5) The drainage of the Fort moat.

It seems an undoubted fact that malaria tends to manifest itself in waves, and that therefore 1909 may have been a "good year" for malaria in Kassala. The even distribution of the rainfall may have been the reason for this.

The present drainage system has undoubtedly caused a very great improvement in the sanitary state of the whole town, and if kept in good working order will prove of immense value. No drained areas held water, apart from actual pits, for more than a few hours after rain.

The giving of quinine undoubtedly improved the health of all the troops before they were exposed to any infection by mosquitoes, and in the same way had a beneficial effect throughout the rains.

That it had a marked protective effect I rather doubt, as on one occasion, when an infected individual arrived in Kassala, three cases of malaria shortly followed among the men sleeping near him in his barrack-room. As a rule, men arriving in the station during the rains were at once sent to hospital and examined medically. I am therefore inclined to think that the quinine probably acted more by reducing the sources of infection than by producing immunity in those exposed to it.

Large numbers of mosquito larvæ were destroyed in all the breeding-grounds. The majority of mosquitoes seen in barracks, I think, came from the cultivated lands to the east of the Arab lines, in spite of the attention bestowed upon the "borrow pits" there.

No really sickly men were left in Kassala at the beginning of the rainy season.

I doubt if a mosquito was bred or harboured in the Fort moat, though in previous years this had formed an extensive breeding-ground.

Recommendations.—Though the admission-rate to hospital during the past rains was low, the Egyptian troops were far from healthy, and I doubt if they were in a fit state to have undertaken much beyond their ordinary garrison duties. If a higher standard of health is to be aimed at, I would recommend the following measures:—

(1) Restriction of the irrigation area.

(2) The granting of £E100 for mosquito works during 1910.

(3) The fencing of the main drains.

(4) The purchase of a reaping machine and mule-drawn rake.
(5) New two-storey barracks.
(6) Provision of proper washing-places for the troops.
(7) Permanent drainage of the Fort ditch.
(8) The issue of mosquito nets to all persons living in barracks.
(9) The issue of beds to all Egyptian troops.

The first four items are essential even if no improvement is desired.

In no instance should land be irrigated within a distance of half a mile in every direction from the barracks. At present the irrigation area comes much too close to the Arab Battalion lines.

It will not be sufficient to discontinue the flooding of land, but all pits which have resulted from the building of the irrigation banks (*borrow pits*) in the areas thrown out of cultivation should be filled up; this of course could be done by replacing in them the earth from which the banks were built, and in addition the land should be cleared of vegetation. Unless this step is taken the barracks cannot be freed of mosquitoes.

It would also be advisable to discontinue the irrigation of certain areas of land adjoining the native quarters to the north of the town, Sheikh Taib Shenaina's village, &c., in order to reduce the number of infected persons and thereby the sources of infection among the civil population.

£E100 will be required for urgent works before and during the rains. To destroy breeding-grounds a constant supply of labour is required, and with this money the grounds of untenanted houses and waste lands could be kept in a sanitary state. Much of the work done with this money would be of a permanent nature and would reduce expenses in future years.

Irrigation may have introduced mosquitoes to Kassala but so many breeding-grounds now exist in the town that even were the practice of irrigating the neighbourhood to be discontinued mosquitoes would not disappear.

Only by fencing many of the main drains can people and animals be prevented from walking in them. At present the banks are constantly being broken down and the flow of water thereby impeded, with the result that grass springs up in the drains, pools are formed, and ideal breeding-grounds are furnished for mosquitoes. This measure is an urgent necessity.

After the rains, as the heat increases, grass springs up around the barracks and in all quarters of the town with such rapidity that it is impossible to cope with it by hand with the number of men

available. In a short time the ground, owing to the present drainage system, becomes comparatively firm, and it should be possible to cut the grass with a mule-drawn reaper; the land is also sufficiently level. I feel sure that the initial expense would be soon recovered by the saving of money spent on labour for the cutting of grass, and at the same time much military labour would be freed for other work. No extra mules or forage would be required, as the animals of the Battalion, or district, would usually be available. A mule-drawn rake would also be of much service, as after being cut all grass has of necessity to be collected and burnt to prevent the breeding of flies.

The present barracks are in a very bad state of repair and of most primitive nature. New barracks would improve the general health of the garrison, especially during the rains. These should be two-storey buildings with all the barrack-rooms on the upper floor, as very few mosquitoes will rise so high. The ground floor would be occupied by offices and stores. I believe this type of building makes for economy by a saving on the making of foundations.

Washing places are required in barracks in order to prevent the men from going to the irrigation pools in the evenings to bathe and wash their clothes, thereby exposing themselves to the bites of mosquitoes.

A permanent stone-faced drain is required in place of the old Fort ditch. This work has been commenced with the money remaining from the original grant of £E50 for the draining of the moat, but the funds available will not be sufficient to complete it.

Mosquito nets should be issued, not only to Egyptian troops, but also to all persons living in barracks, including the Arab troops, as any mosquito coming from the cultivation to the barracks must almost of necessity pass through the Arab lines, where it will encounter numbers of infected persons. For the same reason quinine should be regularly administered to all persons in barracks, as the greatest safety seems to lie in reducing the number of infected mosquitoes rather than in an attempt to produce immunity among troops.

The men not sleeping on the floor seem to be distinctly the healthier, as for example the men of the Medical Corps, who are all supplied with beds and none of whom contracted malaria. Many beds have recently been provided, but more are required.

REPORT ON A FORCED MARCH.

By Major M. SYKES.
(*5th Battalion, Yorkshire Regiment.*)

Preliminary Note by Lieutenant-Colonel C. H. Melville, R.A.M.C.

A Notice appeared in the public press early in November of a forced march undertaken by a detachment of the 5th Battalion Yorkshire Regiment, which seemed on the face of it to be a very remarkable performance, and one full of interest to medical officers. I therefore wrote to Major M. Sykes, of that battalion, under whose command the march was performed, and he very kindly sent the details of the march, with permission to publish the same in the Journal. The march was undoubtedly a striking one, and that it was carried through so successfully must be attributed to the excellent arrangements made in advance by Major Sykes for feeding at regular intervals. The instructions as to massage of the legs appear to be most valuable. Practice in route-marching, as carried out at present, is undoubtedly most useful, but an occasional forced march like the one here reported on would teach us all a great deal that we do not at present know about the management of a long march. I might suggest the practice of really long walks, 35 to 40 miles, with careful records of the amount of food and fluid consumed, urine passed, pulse-rate, &c., as a useful line of research for some of the junior officers of the Corps.

The March.

The detachment consisted of the following :—

Two officers, 1 serjeant-major, 8 serjeants, 4 corporals, 7 lance-corporals, 23 privates, 2 R.A.M.C. orderlies, 1 chiropodist, 1 cyclist. 1 civilian driver, 1 groom, 1 wagon, 2 draught horses, and 2 saddle horses.

The men were mostly townsmen employed either on outdoor work, or clerks and shopmen able to get exercise. They were of fine physique, and had trained specially for the march by taking about a dozen long walks of 10 to 15 miles each during the preceding three weeks. As compared with the agricultural men who marched to Richmond, they showed less physical stamina, but more lightness of heart. They sang and talked more readily, but towards the end began to go off their food, and to show signs of physical (not mental) depression.

Itinerary.—Departed Doncaster, 8.15 p.m.—arrived Whitley, 11.35 p.m.; 13½ miles in three hours and twenty minutes. Left Whitley, 12.35 a.m.—arrived Escrick, 5.20 a.m.; 30 miles in nine hours and five minutes. Left Escrick, 10.30 a.m—arrived York Barracks, 12.40 p.m.; 34½ miles in sixteen hours and twenty-five minutes. Left York Barracks, 1.50 p.m.—arrived Claxton, 5.15 p.m.; 42¾ miles in twenty-one hours. Left Claxton, 6.30 p.m.—arrived Malton, 9.20 p.m.; 53¼ miles in twenty-five hours and five minutes. Left Malton, 6.30 a.m.—arrived W. Heslerton, 9.15 a.m.; 62¼ miles in thirty-seven hours. Left W. Heslerton, 10.10 a.m.—arrived Ganton, 12 mid-day; 67½ miles in thirty-nine hours and forty-five minutes. Left Ganton, 1.40 p.m.—extended for the attack at 3.30 p.m.; 72 miles in forty-three hours and fifteen minutes. Resumed march at 3.45 p.m.—arrived Drill Hall, Scarborough, 4.50 p.m; 77 miles in forty-four hours and thirty-five minutes.

Weather.—8.15 p.m. to 11.30 p.m.: Bright starlight; temperature, 40°. 11.30 to 5.30 a.m.: Foggy; temperature gradually falling to 27°. 5.30 a.m. to 9.30 a.m.: Temperature rising to 45°. 9.30 a.m. to 12.30 p.m.: Temperature rising to 50°. 12.30 p.m. to 5.30 p.m.: Temperature, 50°, and falling to 45°. 5.30 to 9.30: Temperature falling to 35°. 9.30 p.m. to 6.30 a.m.: Temperature falling to 21°. 6.30 a.m. to 9.30 a.m.: Temperature rising to 25°. 9.30 a.m. to 11.30 a.m.: Temperature rising to 35°; blizzard and twenty minutes snow. 11.30 a.m. to 5 p.m.: Temperature rising to 40°; some rain.

Rations.—Whitley: Stew, bread, and coffee. Escrick (arrival): Erbswurst soup—(departure): tea, bread, butter, and sausage. York (arrival): Roast beef, vegetables, Yorkshire pudding, and plum-duff. Claxton: Tea and mince pie. Malton (arrival): Stew, bread, and hot punch—(departure): Erbswurst soup. Heslerton: Tea, bread, butter, sausage, and jam. Ganton: Stew, bread, and butter.

Billets.—Escrick, Malton, and Ganton. The men were given an allowance of three bottles of straw per man at each billet.

Covering.—In the wagon thirty-two horse-rugs were carried, one horse-rug covered two men, the surplus were used to cover the men's feet and to pack the ends of the lines. The rugs were hired for one penny each from a saddler at Malton.

Casualties.—The casualties were as follows:—

Injuries.—Corporal Levitt injured his hip bone at Doncaster by falling on his bayonet; he did not report the matter until he reached York; he was immediately sent home.

Illness.—Another Corporal was found to be suffering from hæmorrhage (piles), and was sent home from York.

Stitch.—Two cases of stitch declared themselves between Claxton and Malton, one rode on the wagon for 5 miles, another for 8 miles.

Colic.—One case of colic developed at Barton Hill; the man was taken on to Malton, and was found to be wearing a tight jacket; another jacket was provided, and he was able to march the remainder of the journey; carried 6 miles.

Sore Feet.—One case. This man started on the march with a pair of boots he had never worn before; he was used as an orderly after Whitley.

Chiropodist.—The chiropodist of the 2nd Battalion, Yorks Regiment, established dressing-stations at every halt, and attended at one time or another to the whole party, with the exception of four. Treatment in all cases was successful.

Manœuvre.—When the men extended for the attack, Major Kitson Clarke, Leeds, O.T.C., and Captain Rose, 10th Hussars, expressed themselves satisfied that the men were quite fit to take part in an attack.

Equipment.—The leather bandolier and web braces seemed to suit the men, but were exceedingly difficult to remove and put on. The whole equipment averaged 25 lb. (rifle and bayonet included).

Shirts.—The men found that the Battalion shirts were exceedingly comfortable and warm.

Socks.—Each man was wearing a pair of thick woollen socks.

Pace.—The pace started at 125 to the minute, and ended at 122.

Massage.—The men's legs were massaged at Claxton, Malton, Heslerton, and Ganton; the effect was very noticeable, and seemed to put fresh life into the men; the massaging was done by the two ambulance orderlies and myself. The leg massage was based on the experience gained in a previous long march of 65 miles done by thirty men in 40 hours 40 minutes. In that experiment we had numerous cases of complete cramp, *i.e.*, muscles of the calf knotting up and preventing marching. On this occasion I began massage at the fortieth mile, and continued up to the end, with the result that no single case of cramp developed. The massage I learned from a Damascene bathman, who said, "This is the way to draw out fatigue," It consists in first bending the joints as follows:—

(*a*) First put your left arm under the knee, then press the leg up with your right hand, until the heel is near the buttock and the thigh rests on the belly (three times each leg), your left arm forming a pad at the knee.

(*b*) Pull the foot as far down as possible, the leg under your

right arm, the calf resting on your knee, till the toe gets almost in the position of a ballet dancer's when she is standing to pirouette (three times).

(*c*) Knead the tendons, with an up-and-down motion.

(*d*) Knead the calf as you would dough, driving the fingers in, but keeping the thumb doubled, and kneading with the joint.

(*e*) Knead the thighs front and back.

(*f*) Knead buttocks.

Note, strong fingers are wanted, stroking and rubbing are quite useless. It would be quite easy for men to do this to one another; at halts I taught the men to squat oriental fashion rather than sit.

Alcohol.—No alcohol was allowed on the march, with the exception of the three-quarters of a tablespoonful of rum at Malton. This liquor was put into the hot milk and sugar, in order to get the men to drink a hot sugary mixture. Tea would have made the hot meat meal indigestible. Coffee would have made them less likely to sleep. The men were under the impression that the rum and milk was about half and half, and expressed themselves as very satisfied.

Tobacco.—As most of the men were cigarette smokers, and to have cut them off from tobacco suddenly might have had an irritating effect on their nerves, I supplied them with a sound but cheap Turkish tobacco. The Turkish soldiers are very fine marchers, and nearly all confirmed cigarette smokers. The tobacco I supplied the men with was a similar kind to that generally consumed by the Turkish troops. I once took a Turk as my servant to the manœuvres in England; while on the march he ran out of his native tobacco, and smoked cheap English-made cigarettes; at the end of two days he became ill, and had to give up smoking until he could procure his native tobacco, he usually smoked about twenty cigarettes per day. The men were very satisfied with the cigarettes, and preferred them to the ordinary American or home-made "fags." Cheap Cyprus tobacco, or Tatli Sert (Turkish) or Yaka (Export Turkish) are equally sound; French Caporal, smoked by the French soldiers, would prove too strong, as would the cheap Italian Toscan cigar.

Food. — The Erbswurst soup was very satisfactory, though hardly to the men's taste; they, however, appreciated its sustaining qualities. The sausages made of beef were a little sickly, those of pork much less likely to pall on the palate.

IMPROVISED STRETCHERS.

By Lieutenant-Colonel H. E. R. JAMES.
Royal Army Medical Corps (Ret. Pay).

There are several reasons why it is desirable that the *personnel* of ambulance units should be practised in the making of temporary stretchers for the hand carriage, and the carriage by rail of sick and wounded unable to walk. Among these reasons are :—

(1) That the Cavalry Field Ambulances and Field Ambulances cannot give up their stretchers to the clearing hospitals or other units receiving the patients, and stretchers in sufficient numbers may not be accessible to those units.

(2) There may be more wounded than can be dealt with by the stretchers in possession of the divisional units.

(3) On outpost or detached duties it may be impossible to procure stretchers in case of need.

(4) It would be a great saving of transport if stretchers could be made on the spot instead of having to be carried there.

The methods of improvisation described require few tools and the materials are to be found in most English farmyards. The first is an emergency stretcher, which takes very little time to make; it is only intended for hand carriage, and cannot be used as a bed. The second takes more time to make; it can be used for carriage by wagon or rail and as a temporary bed. There are many other ways, no doubt, but these two seem to cover the necessities of either case.

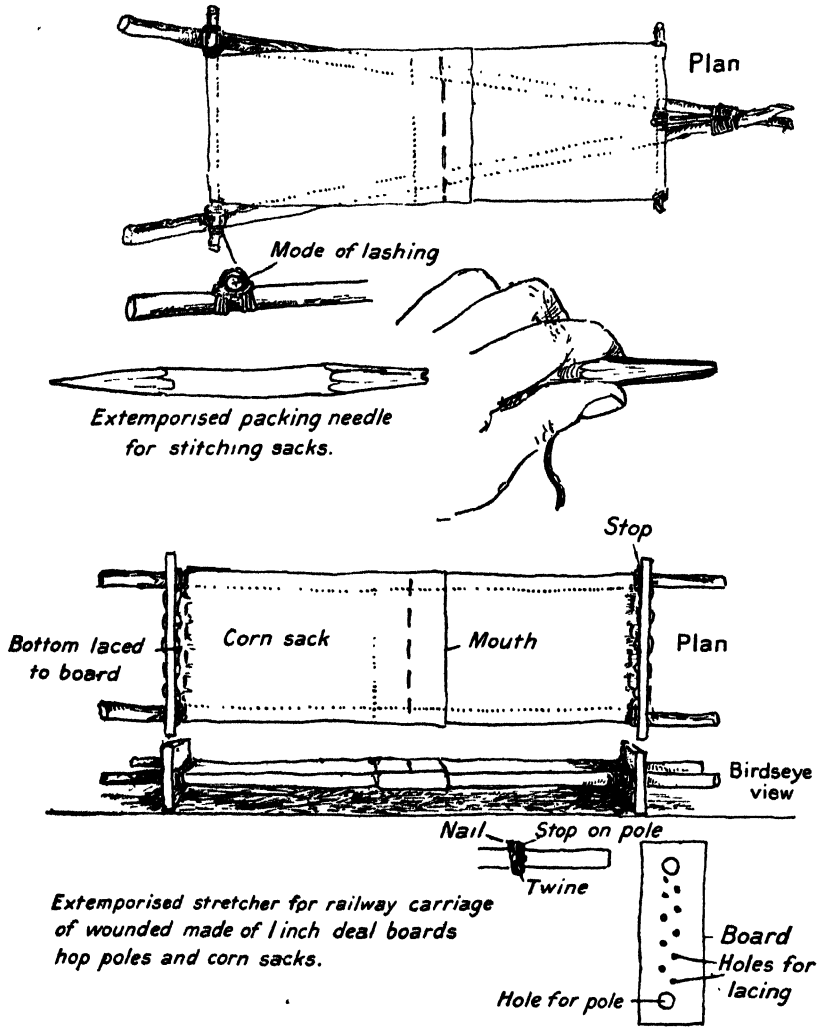
The first stretcher, for hand carriage only, has a triangular frame, which is lashed together with yarn. A quadrangular frame so constructed is very much less rigid, and more liable to collapse.

The requisites for No. 1 are: Two hop-poles or stack-props 2½ to 2 inches in diameter, not less than 9 feet long. Two lighter sticks 1 inch at least, in diameter, and 36 inches long. Two corn sacks, 40 inches by 24 inches (ordinary size). Five yards of rope yarn (tarred for choice).

Tools.—A jack-knife, and a packing needle extemporised out of a piece of stick, as shown in diagram. In the case of a fractured leg or thigh it may be necessary to add transverse battens to prevent the canvas from sagging and the limb from bending over the poles (the patient's heels lie outside the poles).

It is made in this way: The two long poles are laid together,

Extemporised Stretcher made of hop poles & corn sacks



Extemporised stretcher for railway carriage of wounded made of 1 inch deal boards hop poles and corn sacks.

Scale of ½ inch to 1 ft. 3 inches

and their smaller ends are lashed with a lashing 1½ inch wide. The larger ends are separated until, at a distance of 7 feet from the small ends, there is an interval of 28 inches between them. One of the shorter sticks is now passed through the bottom of a sack, coming out at each corner, laid over the poles, and lashed to each with square lashings at a distance of 7 feet from the end lashing.

The second stick is similarly passed through the bottom of the second sack, coming out at each corner, and the mouth of one sack is passed into that of the other until the length of the canvas so formed is 6 feet.

The sacks are now stitched together in this position by means of the extemporised packing needle, the sharp end being used to separate the threads of the canvas, and the cleft end to push the twine through.

The centre of the bottom of the sack nearest the foot of the stretcher is now perforated, and six turns of yarn passed through the perforation, round the stick, and round the lashing at the end of the two poles, and pulled hard until the canvas is thoroughly stretched, when it is made fast.

The second stretcher is a modification of that used in Austria for railway transportation.

The materials required are: Two pieces of planking, 3 feet by 10 inches by 1 inch, if of deal, thinner if of hard wood; two poles 2 inches in diameter, tapering to 1¾ or 1½ inch; two grain sacks 40 inches by 24 inches; 6 yards of stout twine or tarred rope-yarn; four 1½-inch wire nails.

Tools.—A saw, a gimlet, a centre-bit (if possible 2 inches), and brace. An extemporised packing needle, a hammer, a knife.

The boards are perforated by means of the centre-bit, the holes being made large enough to pass the poles through, and their outer edges being 24 inches apart; they are made in the middle line of the length of the boards, their centres 5 inches from either edge. Other holes are made in the boards with the gimlet large enough to pass the twine through easily; ten holes are enough, alternately above and below a line passing through the centres of the larger holes, the two rows of five being 1 inch apart. Holes are made in the corners of the two sacks large enough to allow the poles to pass through. The two poles are now passed through one of the boards, and one sack is drawn bottom first over them, the poles being passed first through the holes in the corners of the sack so as to be inside it.

The second sack is now passed over the poles mouth first, and

the poles are passed through the holes in its corners, and then through the holes in the second board.

The boards are now adjusted so that they are square with the poles, and parallel with one another at 6 feet 2 inches distance. The poles are marked with chalk or pencil where the inner edges of the board cut them, and at this point a nail is driven, for half its length, and twine is wound round to form "stops" which may be further helped by wedging to keep the boards apart. The spare ends of the poles are now cut so that they project 9 inches beyond the boards. The mouth of one sack is now drawn over that of the other, so as to form a continuous canvas of 6 feet long, each end formed by the bottom of each sack being 1 inch short of touching the board. Stitches of twine are passed through both thicknesses of both sacks to keep them in this position. Finally, a lacing is made to fix the bottoms of the sacks to the boards, the twine being passed through the holes in the boards and through two thicknesses of the sack's bottom.

The stretcher so formed is not perfectly rigid, and owing to the poles being round the boards may twist upon them if the stretcher is not evenly carried, but, if properly stoppered and wedged, this will not be found troublesome, and the lacing at head and foot keeps the frame square.

In the Austrian pattern the holes and poles are made square, which prevents the twisting that happens with round ones, and the canvas is secured to the boards with straps and buckles, and the boards themselves are braced.

The only thing that may present difficulty is the making of the holes in the boards. With a small-sized bit three or four holes may be cut and made into one, and this may be enlarged by means of a red-hot iron.

These stretchers have been made and tried by me.

United Services Medical Society.

THE LOAD OF THE INFANTRY SOLDIER.

By Lieutenant-Colonel C. H. MELVILLE.
Royal Army Medical Corps.

The question of the equipment of the Infantry soldier, as it at present exists in the majority of European armies, may be said to date from the era of the Napoleonic wars. Up till that time the importance of strategical mobility was not so clearly recognised, as later, under the influence of Napoleon, it came to be. The kit that the soldier carried appears to have been to a great extent his own business, and the baggage wagons carried as much as they could to supplement deficiencies. With the commencement of the new era, however, it became important to make the infantry soldier as far as possible independent of wheeled transport, the more so that the means of communication, in the end of the eighteenth and the beginning of the nineteenth centuries, were certainly no better, and probably not so good, as under the Roman Empire in the second and third centuries of our era. At the same time, owing to the comparatively short range of ballistic weapons, in the old muzzle-loading days, tactical mobility, that is, rapidity and ease of movement on the battlefield, was by no means so serious a problem as it is now that the range of the rifle and the gun have so enormously increased. It was possible, therefore, to load the infantry soldier fairly heavily for the march, without hampering him excessively when he came to actual contact with his enemy on the field of battle.

The progress of later years has, however, brought a great change. Communications have improved more in the last hundred years than in all the previous history of mankind, prior to the introduction of steam and railways. Strategical mobility has become largely a mechanical question. On the other hand the demand for tactical mobility has increased enormously. The infantry soldier can no longer reserve his fire till his officer has had time to settle with the commander on the opposite side the delicate question of etiquette, as to who should have the honour of receiving the fire of the other, much less can he advance in parade formation till he can see the whites of the eyes of his opponents. Already, at 3,000 yards, he comes under effective

artillery fire, and at 1,400 yards under effective infantry fire. Consequently, from within a mile and a half to a mile of the position attacked all movements must be made with the utmost rapidity, and from one piece of cover to the next. Nor is this all. The enormous size of modern armies entails extraordinary exertions on those troops which are far back in the column of route, if it is intended that they shall be present at the decisive moment. It may be necessary on occasion to place more than one army corps on the same road, so that the most distant troops will be from 25 to 30 miles in rear of those in touch with the enemy. This distance will have to be made up at the last moment in one forced march, or at the best in a march and a half, the troops from the rear perhaps having to go into action straight from the march, without any rest. Again, since the decisive battle or battles will probably take place in the opening weeks, or even days, of the campaign, the reservists who have been called up to fill the ranks will not have had time to get hardened, as in the old days, by a long period of route-marching to the enemy's frontier. The clerk or the shopman will be called, untrained and soft, from the desk or the counter, and thrust straight, with 50 lb. or 60 lb. weight on his back, to march to the sound of the cannon. It is obvious, therefore, that something must be done to lighten the soldier's load. Our men are comparatively fortunate, as they carry under 58 lb. The French private carries 62½ lb., the German 59 lb., the Austrian 61½ lb., and the Chasseurs Alpins, 70½ lb., the heaviest load of all. Even these weights fall below the 80 odd lb. that the Roman soldier of the Empire managed somehow to get along under.

However that may be, there is little doubt that the weight is too great for the modern civilised conscript. The man in the ranks in his period of colour service may stand it, but the reservist, out of condition and soft, will not.

What means are there at our disposal by which we may lighten the soldier's load?

In the first place I will detail shortly what that load consists of, and will take the weights carried by our own men, and place beside them for purposes of comparison those carried by the French, German, and Austrian infantry soldier, an average of these being shown on the table.

For the purpose of this discussion I divide the equipment into six classes, namely, (A) Armament, (B) Clothing actually worn, (C) Accoutrements, (D) Appliances for Shelter, (E) Food and Water carried, and lastly, (F) Necessaries.

It is obvious that these different classes vary in their relative importance, and before deciding what articles, if any, must or can be dispensed with, we must agree on the relationship which they bear to the efficiency of the soldier.

Under A (Armament) I include rifle, side-arm, ammunition, and cleaning materials for the rifle. Under B (Clothing worn) I include tunic (greatcoat in the French Army), trousers with braces or belt, drawers, flannel belt (when worn), shirt, neckcloth, handkerchief, head-dress, boots and putties, socks, identity disc, and first field dressing; these being the articles which the man under ordinary conditions actually wears on the march. Under C (Accoutrements) I include knapsack, belt, braces, ammunition pouches, haversack, water bottle, and mess tin. Under D (Shelter) I include tente-abri and greatcoat (with the exception of the French Army). E (Food) means the reserve ration, unexpended portion of day's rations, and water in the water bottle. The last class F (Necessaries) means all those odds and ends that are necessary for cleanliness or personal comfort, *e.g.*, spare linen, personal cleaning materials, knife, fork and spoon, small book, &c.

Before actually going into the question of reduction, it is necessary to lay down some limit of weight, inside of which we must keep, and for that purpose I must say a few words on the physiological effect produced by the weight carried on the man who carries it.

Every kilogramme of additional weight carried means, of course, an additional expenditure of energy. As long as the load does not exceed 30 kilos., say 66 lb., this increase is regular, if the weight be evenly distributed on the shoulders, and amounts to about 10 small calories per kilo. per minute. Between 30 and 40 kilos. the increase is $13\frac{1}{2}$ calories per kilo. per minute, and above 40, 22 calories. As long as the weight is below 66 lb., therefore, the proportionate increase of energy expended to weight carried is regular, and this weight may be taken as the maximum weight which a man can carry economically.

But it is different if the weight, or any of it, be carried in the hand or asymmetrically. The increase per kilo. per minute is now three times as great as when the weight is symmetrically distributed, and it must be remembered that one of the heaviest individual weights carried by the soldier, the rifle, has to be carried in this manner. This weapon weighs as a rule rather over 4 kilos. ($8\frac{3}{4}$ lb.), and to compare it with the other weights, which are as far as possible balanced, we must multiply it by three. If we do this we must obviously deduct about 8 kilos. from the limit

of 30 to which I have already referred, to give us the actual limit of economical weight. This reduces the load to 22 kilos.

The above calculation is, of course, only approximate, but in the result it coincides almost exactly with the limit laid down by Kirchner, for a man weighing 66 kilos., which is within a few pounds of the average weight of the British private of the line, and also tallies fairly with the observations of Zuntz.

Taking then 22 kilos. (48½ lb.) as our limit, we have next to see which of the different components of the present load of 58 lbs. can be most readily got rid of with a view towards lightening the total amount. The first class, armament, which includes the rifle, side-arm, ammunition, entrenching tool, and cleaning materials cannot well be interfered with; at least if so the suggestion would naturally originate with the General Staff. I may note in passing, that some suggestions have been made with a view to the reduction of ammunition. (See an article in the *Jahrbücher für die Deutsche Armee und Marine* for February and March 1910, by Major von Schreibershofen, of which an abstract appeared in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS in July last year.) There is a suggestion to the same effect from the French authorities. However, we are not concerned here with that question and must accept the deduction of an average weight of 9 to 10 kilos. (in our case rather over 10 kilos.) from our limit of 22, on account of armament: leaving us with 12 kilos., or 26 lb., in hand. As regards the next class it is again difficult to make any reduction. The clothes included are the minimum for actual comfort in a temperate climate. The slight excess in weight shown by our clothing over the average is due principally to the heavier nature of the underclothing issued by us. Our boots and putties together weigh also more even than the long German boot. Any reduction here would, however, be purchased at the expense of health or efficiency, or would certainly entail a distinct risk in that direction. This class, therefore, absorbs nearly 6 more kilos., bringing the unavoidable weight on account of classes A and B up to 16 kilos., about 35 lb., leaving us with a balance in hand of 6 kilos., say 13½ lb. Any reduction in weight must then be limited to the four remaining classes, and must consist, obviously, either in the rejection of certain items, of which they are composed, or of utilising lighter material in their construction, or both. Apart from his fighting gear and his clothing a soldier carries food, water, shelter and necessaries (as already defined). To enable him to carry these, he is provided

with certain receptacles, *e.g.*, knapsack, haversack, water-bottle, and mess-tin, and also with various straps (belt and braces), to enable him to suspend these receptacles on his shoulders and round his waist; these we term accoutrements. (I have included cartridge pouches under accoutrements, on account of their being made of the same material as the belt, &c. This somewhat illogical arrangement is useful, on account of the question of using a lighter material for the construction of these straps, &c.) The first point to notice about accoutrements, then, is that they impose an additional weight merely for the purpose of enabling the man to carry certain weights. They are, so to speak, a necessary evil, and should therefore be kept as light as possible. They can be lightened in two ways: (1) By constructing them of lighter material; and (2) by utilising non-absorbent material. The water-bottle and mess-tin can be materially lightened by using aluminium in their construction. Thus the German water-bottle holds 800 cc., and weighs 200 grammes, the Austrian holds 500 cc., and weighs 140 grammes. The French "*bidon*," holding 1 litre, weighs 455 grammes, and our own with the same capacity, of 1 litre (35 ounces), weighs 663 grammes (1 lb. 7 ounces). If we reduce these bottles to the common denominator of 100 cc. capacity, we find that whilst the Germans and Austrians carry 28 grammes of aluminium to 100 cc. of water, we carry 66, and the French 45 grammes, of enamelled iron and block tin respectively, for the same amount. Taking the Austrian and German figures, it seems obvious that we can get a reduction here of nearly 400 grammes, or about 14¼ ounces by the adoption of aluminium, and still retain our relatively large bottle. The same remark applies to the mess-tin. The German mess-tin, weighing 384 grammes, holds 2½ litres, whilst ours weighing 679 grammes holds rather less than 1½ litres. Here, again, retaining the present shape of tin, we could engineer a saving of about 450 grammes, or about 1 lb. On mess-tin and water-bottle we could save very nearly 2 lb., or 850 grammes, by using aluminium. As regards the haversack weighing 1 lb., not much can be done as regards material. This has to be fairly stout, to withstand wear and tear, and in fact the general weight of the haversack is about 1 lb.

The next items to be considered are the belt, cartridge pouches, and suspending braces. These are made of webbing in our Service and in that of the United States, and of leather elsewhere. The advantage of the latter material is its non-absorbent character. Webbing, on the other hand, though absorbent, can be manu-

factured of a much lighter material than leather. As long as it is lighter it is to that extent preferable to leather, but this advantage, of course, disappears if it is as heavy as leather at the start. Taking the average of the three chief Continental armies, we find that their belt and braces work out at 655 grammes, whereas our webbing belt and braces weigh 616 grammes. As a matter of fact, those of the German and Austrian armies weigh decidedly more, 750 grammes about, whilst the French (of somewhat inferior leather) weigh decidedly less, viz., 450 grammes. It is obvious that in this respect we gain little by the adoption of webbing. In the German and Austrian weights solid brass buckles are included, so that there is not the slightest doubt that with a little modification leather belt and braces of good quality could be furnished at the same weight as our webbing articles. On the other hand, there is the disadvantage that webbing is absorbent, and the thick material used by us just now is extremely so. I have tried the experiment of soaking some webbing in water and find that a piece with an original weight of 160 grammes took up as much as 30 grammes of water. Calculating on these figures we see that our belt and braces might, after very heavy rain, weigh well over 700 grammes. Webbing can, however, be made much thinner than that used by us, and still retain its strength and elasticity. The webbing used in the old bandolier equipment for the water-bottle strap, intended to bear a weight of 3 lb. 7 oz., is an excellent example of such material. Not only is it strong but, being much thinner, is much less absorbent for the same length. There seems no reason why belts and braces should not be made of a material of this nature. The saving in weight would then be probably as much as 300 grammes, if not more.

We now come to the knapsack. The average weight of this portion of equipment in the French, German, and Austrian armies is about 1½ kilos., say 3¾ lb. Our pack weighs 677 grammes, say 1½ lb. Obviously we have here a very positive advantage, except for the fact that the material is absorbent. Using our previous calculation we find that the weight of this pack might conceivably mount up as high as 1· lb. 13 oz.; still, even so, we have a great advantage over the continental nations. It is doubtful whether the pack could safely be made of thinner material, since it suffers more than the rest of the equipment from wear and tear. The canvas, of which the Norwegian ryper-sack is made, is in my opinion, very much superior to that used in our present pack, and

it appears to be decidedly lighter, though the sack as a whole, owing to its enormous capacity, is heavier.

As regards cartridge pouches, we carry five small pouches on each side, the Germans two large ones in front, and the French and Austrians two in front and one behind. Ours weigh about 1½ lb., and the French and German somewhat less. The Austrian pouches weigh nearly 3¾ lb. On the other hand, our pouches carry 150 cartridges, whereas those of the Germans carry only 90, the French 120, and the Austrians 100. From the point of view of the present discussion the chief objection to them is that they are made of absorbent material. Perhaps aluminium might be used here again, but the question is difficult for us to discuss here.

As regards accoutrements then, there is distinct room for improvement in the materials of which the water-bottle, mess-tin, belt, and braces are made. The former should be made of aluminium, and the last of light, stout webbing, or rather girthing. On the whole we might save here about 1,150 grammes, or say 2½ lb. Keeping to our present weights our balance in hand is now reduced to 2·2 kilos., or just about 5 lb. Even so apparently insignificant a saving as I have just mentioned is not to be despised. Assuming its possibility, our balance in hand is raised to nearly 3½ kilos., or 7½ lb.

The next necessity of the soldier is shelter. All nations practically, with the exception of ourselves, provide a shelter tent, weighing from 2 lb. to 3 lb. If there is one point on which the British soldier may be considered an expert it is in variety of climate. I do not refer to our native climate, though that alone is a liberal education in this respect, but to the climates of the different countries in which our army has fought. We have managed so far to carry on without a shelter tent, and I do not think that its introduction is necessary. On this question I would like to point out that the chief object of a shelter tent is to assist in maintaining the body temperature. This can be done probably just as easily by assisting the production of heat as by hindering its dissipation. In my opinion the weight of the tent would be better expended in food. In addition to the tent there is the greatcoat. This, again, is extremely heavy, our army heading the list with a weight of 6 lb. 13 oz. I am very doubtful if this weight is well expended. A greatcoat is excellent as far as the waist; below that it hampers a man in walking, and rucks up, leaving his legs exposed when lying down. What is needed for the protection of the lower limbs is either a long full cape or kilt hanging

round the waist (Burberry makes something of this nature, and I believe the 5th Gurkhas thought at one time of adopting this pattern), or a pair of stout overalls, such as men use for motor bicycling, or policemen wear on point duty. These last would not hamper the man to any extent in his movements, and would certainly keep in position during the night. These could be supplemented by a rather full-skirted pea jacket, such as the "coat, warm, British," which all who have served in India know well. It is to be noted that the Norwegians do not issue a greatcoat, but provide in lieu of this a thick "sweater" weighing 1,072 grammes, plus a sleeping bag weighing 1,500 grammes. The combined weight of these is 5 lb. 11 oz., decidedly lighter than the greatcoats of the British, American, or Austrian armies. Whilst on this subject of greatcoats it is perhaps only fair to refer to the French experience in this matter, as giving the other side of the question. In a very interesting book, "In Morocco with General d'Amade," by Mr. R. Rankin, the following statement occurs: "One would have thought that the long greatcoat would be the most uncomfortable article of clothing, very ill suited to campaigning in a hot climate; but the legionary swears by it, and says it is cool in summer and warm in winter, an easy thing to march in with its flaps buttoned back, and a warm thing to sleep in with its flaps let down." As is well known to you all no doubt, the French soldier wears a greatcoat without a tunic or jacket underneath, as his regular service dress. I think a pound or so might conceivably be saved on the greatcoat. The German coat, which is of excellent material, weighs only $3\frac{3}{4}$ lb., and the adoption of a similar material might save us, say, 3 lb.

Considering the equipment so far, we see that by using a lighter material for the construction of our mess-tin and water-bottle we could save 1 lb. 14 oz. (850 grammes), by using lighter webbing for the belt and braces, say $\frac{1}{2}$ lb. (226 grammes), and by lightening the greatcoat perhaps another 3 lb. (1,359 grammes), making a total of 5 lb. 6 oz. (2,435 grammes). The present weight of the articles I have referred to is nearly 16 lb., so that the saving mentioned is not inconsiderable.

We have considered so far the armament, clothing, accoutrements, and shelter which the soldier carries, and in doing this have expended at present weights 22·941 kilos., or nearly $49\frac{1}{2}$ lb.

Admitting the reductions in weight that I have suggested, we still have rather over 4 lb., say 2 kilos. in hand.

We must now discuss food and water.

Obviously these are of extreme importance, in fact, of more importance than shelter, and if it is a question of a conflict of choice they should certainly be awarded preference.

The water carried by the British private weighs 2 lb. 3 oz., and here no reduction is possible. The food carried by the man is at present one emergency ration weighing 9½ oz., and the unexpended portion of his previous day's ration. This last is an indeterminate amount, but if we place it at 12 ounces of bread or biscuit, and 6 ounces of meat, with, say, 2 ounces of groceries, we are giving a liberal margin. The total of this is then under 2 lb. The only reduction possible here is in the tin of the emergency ration. This weighs empty 3 ounces, so that the soldier carries one part of tin for each two parts of nutrient material. Obviously the reduction, if possible, is slight only. As a matter of fact, if there ought to be any alteration in the weight of food carried it should be in the direction of an increase. The subject of provisioning in the field is far too lengthy a one for discussion at this point, but there is a general consensus of opinion among thinking soldiers that the man must be made more independent in this matter. The Germans carry two iron rations weighing 3 lb. 9 oz., the French 4 lb. 3 oz., the Austrians 6½ lb., in each case additional to any unexpended portion left from the last daily issue. These weights therefore should be balanced against the 9½ ounces of our emergency ration. Obviously here we must calculate not on any saving but on an increase in weight. What exactly that increase should be I am not going to discuss now, but taking the average of the three nations mentioned, it is probable that the total carried on this account should be 4 lb. 12 oz., making a total of about 6½ lb. for rations, or about 8¾ lb. as food and water.

It is possible, however, with the reductions I have suggested, none of which are, I venture to say, extremely revolutionary, to so reduce the weight of certain items of equipment (so far we have come across none that we can absolutely dispense with), as to leave us with a deficit of only a little less than 2½ kilos., say 5 lb. It might be possible, with further modifications, to go even a little lower than this, say by lightening the boots and the underclothing, but personally I should object to this on sanitary grounds. In short, I cannot see that at present we can reduce the weights carried by the soldier below about 24½ kilos., or 54¼ lb., if we wish him to be fully armed, clad, fed, and sheltered.

I have so far left out of consideration Class F., or Necessaries. As will be seen, these bulk fairly considerably in the Continental

armies. They may be divided into: spare linen and other clothes, personal cleaning materials, drinking cup and cutlery, and personal documents, *e.g.*, small book, and, in the case of the German soldier, a song book. If these are to be carried always by the man, then whatever other modifications we make we impose on him an excess weight of 4,300 grammes, or about 9 lb., which is an unfair impost. It must be remembered that every kilo. of this weight is equivalent to $1\frac{1}{2}$ kilo. of weight below 22. The question at once arises—are these so-called necessaries required? Is it absolutely essential that a man should wash and shave every day? Personally I have had to abstain more than once from these luxuries, and for a considerable time, and so, I daresay, have most of my audience. The condition is one of acute discomfort at first, but within limits it is not necessarily a cause of serious disease. If a man, to put the matter brutally, is well fed, well clothed, and well sheltered, he will not suffer in health merely because he is dirty and unshorn. Of these so-called necessaries I would abolish all as compulsory articles (to be carried, that is, by the man himself on all occasions) except the cup, and cutlery, and small book. The weight of these is not great, under 400 grammes, and could be lessened by making the fork, spoon, and knife-handle of aluminium. The great point of this reduction is that if we dispense with these necessaries we also dispense with the receptacle in which they are intended to be carried, and that is the pack, weighing 800 odd grammes.

My idea is that all what may be called luxuries, and a clean shirt *is* a luxury, should be carried on wheels. The soldier is an expensive specialist, and it is false economy to turn him into a baggage animal, which is a poor form of unskilled labour. It would be necessary to have some waterproof cover for the great-coat which could be carried on the back. This should not be soft and shapeless, like the present pack, but as rigid as compatible with lightness, so that the points of contact with the body should be as few as possible. In this and the haversack the food and other articles could be carried. The pack should be available when possible, that is, during periods when the troops are stationary or moving under no particular stress. When the real call comes for work the soldier should go stripped into action with no weight on his back but that demanded by the actual needs of fighting, which must come first, and of keeping body and soul together, which, except as a condition precedent to the fighting, comes second. To quote from a German officer, Major H. v. Feldmann, "Anything that

the Infantry soldier carries which he can afford to do without for a fairly long time without serious injury to his health is extremely superfluous."

NOTE.

Since reading the above paper I have come across a very interesting essay on the same subject ("Bekleidung und Ausrüstung der Infanterie"), published in *Streffleurs Militärische Zeitschrift*, in 1907, by Oberst im Generalstabscorps Alfred Kraus, of the Austrian Army. This paper contains a most interesting quotation from a memorandum of von Moltke's, which seems worth reproducing in this connection. It was originally written in 1860, in connection with a report furnished by Oberstleutnant Ollech, of the Prussian General Staff who accompanied the French Army in the Italian Campaign of 1859 as Military Attaché. In his report Colonel Ollech suggests the advisability of forming, presumably as an experiment, though this is not stated, "one battalion of genuine Light Infantry." Von Moltke's minute on this runs as follows —

"From the standpoint of the higher strategy what we want is not a 'light battalion' but a 'light army.' . . . A tactical victory is only decisive when it occurs at the strategically correct position, and that can only be attained by an army equally mobile in all respects. . . . An army which, starting from Rossbach on November 5th, could fight at Leuthen on December 5th, would be as good as doubled. . . . Such mobility is only to be expected when the army is formed of sturdy men, well practised in peace, *well fed in the field, and carrying as regards all arms a really practical equipment.* . . . An army which marches light will also manœuvre freely. Therefore every weight that man or horse carries is of importance, and also the way in which it is carried. Every one agrees that our equipment must be lightened, but when it comes to the point, and we have to decide what actual articles have to be dispensed with, there is endless variety of opinion." As Colonel Kraus says, this last sentence of von Moltke's speaks volumes. Von Moltke advocates in his minute the abolition of the individual mess-tin and the provision of travelling kitchens, and also suggests that the man should no longer have to carry his reserve rations. Colonel Kraus himself suggests the following reforms:—

(1) The abolition of the knapsack, replacing it by a smaller and lighter article.

(2) Restriction of the equipment to the absolute necessities, as follows: Rifle, if possible without bayonet, 200 cartridges, entrenching tool; two reserve rations; a spare pair of foot-cloths or socks; a pair of light shoes; abdominal belt; plate and spoon; water bottle; and identity disc.

(3) Light-grey uniform of light cloth cut to fit easily, leaving the throat unconfined; leather straps to be grey or natural colour; metal parts dull; a light, short cape, with sleeves, cut almost circular in shape (möglichst radförmig geschnittner mantel), it would appear that something like a sleeved poncho is intended.

(4) These articles of clothing to be supplemented in winter by warm underclothing and by a thicker lining for the cape, or if necessary, fur. These extras to be sent to the front as needed.

DISCUSSION.

Surgeon-General GUBBINS agreed that the pack and necessaries should be carried in the cart. He referred to the use of "shorts" instead of trousers as a means of saving weight, and as allowing greater freedom in movement.

Lieutenant-Colonel R. J. S. SIMPSON referred to the fact that the present greatcoat is no protection against rain.

Lieutenant-Colonel J. B. WILSON said he would have liked to have heard some suggestions as to how the weight should be carried.

Major W. S. HARRISON related an experience in the Khyber, where a "scout section" of a regiment took to the use of "shorts" with the result that every man was laid up for a week with blisters round the knee; possibly this would not have happened if they had been accustomed to leaving their knees bare.

Major LYLE CUMMINS suggested experiments with single-wheeled carts for carrying packs.

Lieutenant-Colonel BURTCHAELL said, with reference to the use of carts for carrying packs, it was very difficult for men to get their property at night when their packs were carried on the carts. The Gurkhas used "shorts" largely, but after Magersfontein a very large number of Highlanders suffered from severe blisters behind the knees as a result of lying out in the sun all day.

Surgeon-General BABTIE agreed that it was necessary to increase the amount of food carried by the soldier. The present form of greatcoat would have to go.

Major BEVERIDGE agreed that aluminium should be used for messtins and water-bottles; it did not give a taste to the food if it was pure, but if there was more than 1 per cent. of iron in it the food acquired a

marked taste. Probably the new alloy with magnesium would prove the best material.

Colonel Sir DAVID BRUCE found in South Africa that where men could carry baggage on carts, the baggage grew very rapidly. He had seen severe blistering of the knees among the Highlanders at Ladysmith. In German East Africa single-wheeled rickshaws were used.

Colonel MELVILLE, in reply, said that he would like to see the introduction of the rücksack, but it was doubtful if one could persuade the British authorities to adopt it as it was so difficult to pack neatly. Experiments with waterproofing were being undertaken. He thought that men should all carry three days' "iron rations" of 2 lb. each. To get over the difficulty of blistering with "shorts," and as a protection to the knees at night, it might be possible to arrange a turn-down fold at the bottom of the coat.

THE TRAINING OF TERRITORIAL MEDICAL UNITS.

BY CAPTAIN W. A. WOODSIDE, (T.).
Royal Army Medical Corps.

THE subject on which I have the honour to address you this evening is one of some importance to most of us, and more particularly so to those who contemplate applying for one of the Adjutancies of the Royal Army Medical Corps (Territorial) Schools of Instruction.

The officers, to whom the training of the Territorial branch of our Service is entrusted labour under certain difficulties which are peculiar to the body with which they have to deal. In the limited time at the disposal of their pupils, they have to train them to a state of efficiency as nearly approaching that of their regular brothers as possible, and at the same time to devise their instruction in such a manner as to make it attractive, in the hope that by so doing they may encourage the enlistment of fresh recruits, and so maintain their units at proper strength.

I trust that my remarks, which are based on an experience of three years as Adjutant of one of the Territorial Medical Schools, and of those who may be good enough to join in the discussion later, may prove of real assistance to the numerous officers, Regulars and Territorial, who will sooner or later have to undertake these duties.

The raising of the requisite number of recruits for all units of

the Territorial force is the duty of the County Associations concerned, but much can be done by the individual members of the unit to stimulate voluntary enlistment, on which the County Associations mainly rely, such as by social functions for members and friends of the unit during the winter, and by holding public meetings at the various towns and neighbouring villages where the units are raised. In such cases the help of influential local men should be requisitioned, and the existing officers, non-commissioned officers and men should be judiciously distributed among the audience, where they can be relied on to do their best to persuade likely recruits to join their unit.

I mention these aids, as there might be a repetition of the recruiting difficulty, on the termination of the four years' agreement under which Territorial soldiers first joined.

The recruit as a rule, gets his elementary instruction from the serjeant instructor of his unit, but at some period during his first year he has to pass through the school of instruction, which moves about from the headquarters of one unit to another when sufficient recruits have been collected to form a class.

When large numbers of recruits join at the same time, the whole of the preliminary instruction is carried out by the school of instruction. Their instruction is similar to that given at the Royal Army Medical Corps Depôt, Aldershot, in squad drill, stretcher drill, wagon drill, first aid, and the elements of field work and sanitation.

A recruit must put in forty-two attendances in his first year, and pass class before he becomes entitled to the fifth rate of corps pay.

The school of instruction consists of an adjutant, two instructors from the Royal Army Medical Corps, and one transport instructor from the Army Service Corps. It is their duty to accompany all medical units of their division to camp during annual training, where instruction in accordance with the syllabus laid down in Part III., Royal Army Medical Corps Training, is carried out. The adjutant has to act as general adviser to all medical officers during training, including regimental medical officers, many of whom he meets for the first time there.

The Administrative Medical Officer or the Adjutant has to decide which unit the school of instruction should accompany when two or three are out for training in different places at the same time. Under these circumstances I think it advisable to accompany the least efficient unit, or take them in turn, and I recommend keeping

the whole of the staff of the school of instruction together during camp, in preference to dividing them up among several units. The instructors, when sent singly to units, find that any pre-arranged programme is difficult to carry out, as it may interfere with local arrangements.

It is also the duty of the school of instruction to hold alternative courses of eight days' duration annually at the headquarters of each of the units in the division, where those members of the Royal Army Medical Corps (Territorial), who were unable to attend camp, may, by taking this course, become efficient for the year.

As these courses are compulsory, and all ranks receive pay and allowances while attending them, no difficulty is experienced in arranging for them. This is not so with initial courses of instruction, which young officers have to attend in their first three years of service to qualify for their outfit grant.

These and preparatory courses of instruction for examinations "A" and "B" for Lieutenants, and "D" for Lieutenant-Colonels, are most difficult to arrange to suit regimental medical officers and others who may live at a great distance from the headquarters of a medical unit. This difficulty has to be met by holding separate classes for those who cannot attend at the ordinary time.

The school of instruction for the greater part of the year is located at its headquarters, which is in some central part of the divisional area where a field medical unit exists. The Officer Commanding that unit acts as commandant of the school. When courses of instruction are not in progress, the morning is taken up with office work, such as setting and correcting examination papers for all candidates for promotion among the Royal Army Medical Corps (Territorial), non-commissioned officers and men of the division, and correcting papers from those officers who are undergoing preparatory courses of instruction by correspondence. This method of postal instruction has proved very useful to those who cannot attend the school of instruction.

For the adjutant the afternoon is generally free, but it is the most convenient time for medical men to attend classes, and when the school of instruction is located with units away from its headquarters, the afternoons are generally fully occupied.

The greater part of the special instruction for all ranks in their mobilisation duties is carried out under the various instructors in small classes in the evenings at the headquarters of the different units, or their detachments, where special instruction in nursing, cooking, transport work, clerical work, drills, storemen's duties, and

the method of keeping messing-books and pay lists is given. Instruction to the Quartermasters and other officers is given in keeping messing accounts, canteen accounts, pay lists, in map reading, and in methods of judging rations, forage, and framing sanitary contracts, and contracts for the supply of horses and harness prior to annual training.

Classes of instruction in the various duties to be performed by the different members of a unit on mobilisation have to be arranged for, and in this respect I advocate very strongly that, after the first year, for the rank and file, at least five of the ten compulsory attendances prior to camp should be devoted solely to learning the duties appertaining to their particular work on mobilisation. This presupposes that the unit has been divided permanently into sections and sub-divisions, and that each man is detailed for a particular job, and works under his own particular officers and non-commissioned officers, who, under this arrangement, take more interest in the instruction and efficiency of their men than if they were interchangeable between sections and sub-divisions, and liable to be changed from one duty to another, acting as assistant cook at one time and as wagon orderly or a tent orderly at another. It also creates a healthy rivalry between the sections.

The compulsory attendance of Territorial soldiers for instruction prior to their annual training in camp is so short (only ten attendances) that one has not time to make them efficient in more than their own particular duties on mobilisation. This requires a great many more small classes, and very often individual instruction, as it is difficult to get all the men requiring the same instruction to attend at the same hour on the same evening. But after the officers and N.C.O.'s have passed for their promotion, I generally find they can relieve the permanent staff of much of the work, by taking some of the classes for the men of their own particular sub-division.

Until one comes to actually work out the mobilization scheme, and allot men to all the various duties which have then to be done, it is difficult to realise how various these duties are. With a view of demonstrating this fact, I have prepared a duty plan for each field ambulance, showing the *personnel* split up into its sections and sub-divisions, with the duty of each man clearly shown. When a private is posted to a particular sub-division for a particular duty, his name is pinned on the plan over the particular duty he has to perform, and the details of his duties are specially taught him. He is also given a card with his duties printed on it. The advantage of this duty plan is that one can see at a glance whether

the unit is up to strength, and if not, what particular duty has been left unallotted.

The Officer Commanding can then devote special care to recruiting the required class of men for these duties, and order special instruction for them, and so appoint suitable men to the vacant posts.

The instruction of N.C.O.'s has to be on quite a different plan: they must, like the Regulars, have a general knowledge of all duties; but as they have not the same experience, special classes have to be formed at the different field ambulances, by the school of instruction, where the candidates are specially prepared *for promotion examinations.* When fully qualified they are expected to take part in the instruction of the men of the special sub-division to which they belong.

The transport sections are a very important part of field ambulances, on which much of the efficiency of the units depends. In connection with the training of these sections the Officers Commanding have, in turn, at their disposal the transport instructor, who finds his time fully occupied in getting all ranks of the transport sections into a state of efficiency, capable of carrying out their work independently on mobilisation. I consider it is essential that the Adjutant of the school of instruction should have a fair knowledge of horse management and transport work, to enable him to give advice on matters such as the hiring of wagons, horses, and harness suitable for the work in camp. If these matters are not carefully supervised by an experienced officer or a board of officers, the result is inefficiency, through the unit being supplied with unsuitable wagons and harness, and a lot of horses that it is difficult to work with.

As an example of this, I have seen one unit during its first annual training supplied with wagons without brakes or skids, and harness without breeching, for use in a very hilly country. In most camps many horses have to be returned to the owner, as being unsuitable, through vice or disease.

As there is no saddler, farrier, or wheeler enlisted in the medical unit, it is very important that all gear supplied should be in a serviceable condition, and capable of withstanding fifteen days' hard wear and tear.

These difficulties may be greatly diminished by a judicious selection of the transport officer, but an Officer Commanding finds a difficulty in making this selection unless he himself has some experience of horses and transport work.

Route marches are carried out by units prior to annual camp

training; these are generally very well attended, and serve to get the men into condition for marching during the annual training. They also serve to get drivers familiar with the horses, wagons, and harness which they will have to work with in camp, as we arrange for the same contractor to supply us during transport drill and marches, and also during camp, with the same horses if possible.

The training of officers is carried out by preparing them for the examinations A, B and D, which they must pass within a given time. The difficulty is to get them to attend for instruction. In some cases it is impossible on account of their civil employment, and the distance from headquarters. In these cases a course by correspondence is offered them, but the busy medical practitioner finds it difficult to devote the time to looking up and answering a series of questions, and in some cases they apply for permission to attend the school of instruction for eight days, with pay and allowances. If granted the pay is sufficient to cover the cost of a *locum tenens* during their absence from their practice.

In addition to their training in camp, and in preparation for examinations, officers derive a knowledge of what their duties on mobilisation would be by attending medical staff tours in the locality in which they would be called upon to serve. I have found an easy way to get the groundwork of a medical staff tour is to get all the details of an old staff or regimental tour, which has been worked out by combatant officers, and then work out and add the necessary medical arrangements, or enlarge on them, if they have already been worked out.

In connection with staff and regimental tours, it is very important for medical officers to write an appreciation, but this need not be from the combatant officer's point of view. The appreciation from a medical officer's point of view should deal with medical matters, and show that he is fully conversant with all the existing local, military, and civil hospital accommodation. The medical *personnel* of the war establishments of the troops engaged, the facilities for obtaining additional *personnel* and equipment, and the available means of evacuating and distributing casualties, during the early stages of the operations.

The training of all ranks would be greatly facilitated if suitable diagrams were provided for the use of those who undertake the instruction of the units in such things as camp sanitation and field work, at a time when practical demonstrations cannot be given. I have made some rough diagrams on paper, which I find most useful when holding classes.

Clinical and other Notes.

INTUSSUSCEPTION COMPLICATED BY APPENDICITIS IN AN INFANT AGED EIGHT MONTHS.

By Major G. J. STONEY ARCHER,
Royal Army Medical Corps.

Infant boy, M., aged 8 months, was brought into the Station Hospital, Secunderabad, at 7 a.m., March 27th, 1910, by Major E. P. Hewitt, R.A.M.C., who had seen him at 2 a.m. the same morning, when he was suffering from violent colicky pains, accompanied with vomiting, and the passage of stools consisting of blood and mucus.

There was a history of the child having previously had severe attacks of colic, but otherwise he was a healthy, well-nourished child. It was altogether breast fed.

When I saw him on admission, the little patient was in a very collapsed condition, and was vomiting almost continually small quantities of bile-stained fluid. Temperature 101; pulse 140; respiration 40. A cylindrical tumour could be felt below the right costal margin, running up from the right iliac fossa.

Acute intussusception was diagnosed, and it was decided to operate at once. The skin of the abdomen having been disinfected with tinct. iodi., an incision was made through the outer portion of the right rectus sheath opposite the umbilicus. The intussusception was withdrawn through the wound and reduced without much difficulty. The walls of the cæcum were found to be considerably thickened, and the distal portion of the appendix was swollen and of a dark, dull, red colour, and there was a marked constriction about an inch from its end. The meso-appendix was ligatured and the appendix removed, the stump being inverted in the centre of a purse-string suture. The abdominal wound was closed in three layers, the peritoneum and sheath of the rectus with formalin-iodine catgut, and the skin with silkworm gut. Slow continuous saline injections, per rectum, were given at once and continued for twenty-four hours. There was no return of the vomiting, and he was able to take the breast strongly the same night, the further course of the case was uneventful and he was discharged hospital with the wound perfectly healed on April 6th. It is now eight months since the operation was done, and he has since been perfectly fit and the wound shows no signs of bulging.

On slitting up the appendix the mucous membrane of the distal portion was found to be congested and ecchymosed, and close to the constriction there was a small ulcer about an eighth of an inch in

diameter. These two conditions occurring together in so young a child must be extremely rare and therefore I think the case is worth recording. It is also interesting to consider whether the appendicitis was the cause of the intussusception; personally I think it was, although it is not mentioned in the text-books as a possible cause.

I have to thank Majors E. P. Hewitt and A. H. Waring, R.A.M.C., for their help and advice both before and during the operation.

A CASE OF INCOMPLETE MYELITIS FOLLOWING UPON AN APPARENTLY TRIVIAL INJURY.

By Captain W. R. GALWEY.
Royal Army Medical Corps.

Lieutenant S., while training with his regiment on March 29th, 1910, fell upon a wire fence, slightly bruising and scraping his back in the mid-dorsal region, and on the right side. Beyond slight stiffness, he felt no inconvenience until April 3rd, when he began to feel seedy. On April 4th he proceeded with his regiment to the hills. On arrival in camp that evening he reported sick to me, complaining of fever, headache, and general malaise. His temperature was 100·4° F. I put him to bed and administered a purgative, which acted well. Next morning, April 5th, his temperature was 101° F. As I was marching with his regiment, I handed the case over to Captain C. W. Bowle, R.A.M.C. During the day the patient stated that his legs felt stiff, and he had sensations of pins and needles in them. On April 6th, he had loss of power in both legs, and fell when getting out of his bath. On April 7th he was totally unable to use his legs, and could not pass water. He was exceedingly constipated. He never vomited, nor were any sensory disturbances discovered at the time.

On April 9th the patient was transferred to the Station Hospital, Lahore Cantonments. On admission, he was found to be suffering from complete paralysis of both lower extremities, inability to pass water, and some loss of control of the anal sphincter. No sensory disturbances were found beyond slight pain on pressure in the right iliac fossa. His temperature and pulse were normal; his general condition excellent. During his stay in Lahore he had another slight rise of temperature.

On April 24th the patient was transferred to a hill station, Dalhousie, where he again came under my care. I made the following notes on his case:—

Previous Medical History.—He has always been healthy, and has indulged freely in field sports. He had a slight sore throat during the last week of March, but a swab, which I took after his arrival in Dalhousie, was negative for diphtheria bacilli. He has never suffered from venereal disease.

Family History.—He is one of a large family, all alive and well; his mother and father are healthy. There is no history of any nervous disease in his family.

On Examination.—The patient is bright, intelligent, and well-nourished; he answers questions clearly and readily, and is most cheerful. Respiratory system, normal. Circulatory system, normal. Digestive system: Tongue rather furred; is very constipated; complains of slight tenderness on deep pressure in the right iliac fossa.

Nervous System.—No psychical symptoms. Has no loss of memory. Cutaneous sensation is brisk, no anæsthetic or hyperæsthetic areas were found, except as above stated, in the right iliac fossa and over the spine, at the level of the fifth lumbar vertebræ. Sensations for heat and cold; pain and touch are normal.

Reflexes.—The pharyngeal reflex is almost entirely absent; the abdominal, anal and cremasteric reflexes are very sluggish; the plantar reflexes are slow and very feeble; knee-jerks absent on both sides.

Muscular System.—There was at first complete loss of power in both lower extremities, but now there is a slight return of power. The right leg can be moved more than the left. The leg and thigh muscles are lacking in tone, but wasting is not apparent. He can tell accurately the position of the limbs when raised from the bed or moved from side to side. A distinct *tache cérébrale* can be obtained on the skin of the chest. There does not appear to be any trophic disturbance.

The Special Senses.—The pupils react to light and accommodation; there is no nystagmus or ptosis; the left pupil is slightly larger than the right. Urine: passed 69 ounces in twenty-four hours; low specific gravity; neither sugar nor albumin are present. A leucocyte count taken a week later gave 10,870 per c.mm.

The patient was given liq. Fowleri and liq. ferri perchlor āā ɱv. t.d.s. He was also treated by massage and the Faradic current.

On May 12th there was a faint knee-jerk obtainable on the right side. Power gradually returned in both legs, and on August 5th I made the following note:—

The patient has completely recovered the use of his right leg; he can walk well with sticks, and slowly unaided. The left lower extremity is still very weak in all movements, particularly when raising the leg with the thigh semi-flexed, as in the sitting position.

The patient was brought before an Invaliding Board in September, and recommended for six months' sick leave to England. The improvement has been so great that I hope that the patient will regain complete power in the left leg.

TUBERCULAR MENINGITIS FOLLOWING MALIGNANT TERTIAN MALARIA.

By Captain W. R. GALWEY.
Royal Army Medical Corps.

Private M., 2nd Leinster Regiment, aged 21, service in India one year, total service three years, was admitted to the Station Hospital, Dalhousie, on May 11th, 1910, suffering from fever.

The notes on admission were as follows:—

He has suffered much from malaria since his arrival in India. The entries in his medical history sheet are for slight illnesses, such as debility, with the exception of middle-ear disease, for which he had a radical mastoid operation performed about a year ago. He states he had no severe illness before enlistment. His family history is suggestive of tuberculosis.

On Examination.—He is ill-developed, with a slight stoop; he is sallow, with much malarial pigmentation; his conjunctivæ have a slight icteric tinge. His temperature on admission was 101° F.

Digestive System.—Tongue furred and foul; abdomen slightly distended, with a few rose-like spots; liver dulness reaches to the level of the fifth rib in the nipple line.

Respiratory System.—Fibroid dulness over the base of the left lung, with almost total absence of breath-sounds; right lung is normal.

Circulatory System.—Area of superficial cardiac dulness normal; pulse quick and febrile; heart-sounds normal.

He has a slight angular curvature of the spine in the region of the tenth and eleventh dorsal vertebræ. He does not appear to have noticed this, nor even to have complained of pain in this region.

On admission the aspect of the case was that of early enteric fever, but blood examination revealed malignant tertian rings and crescents in the peripheral circulation. The case yielded readily to quinine, iron, and arsenic. The patient convalesced, and was allowed up and out in the hospital compound. However, on the evening of May 20th his temperature rose to 100° F., and crescents were again found in the peripheral circulation. On the following day his temperature was 101·4° in the morning and 101·6° in the evening. He was so ill that he was transferred to the special wards. For the next three days his temperature remained about 99° F.; arsenic and iron were still administered, and on May 25th I again ordered quinine bisulphate gr. xx. per diem, which I had omitted for the previous week.

On May 27th he became much worse, comatose, with loss of knee-jerks, temperature 103° F., pulse 136. From May 28th to June 1st quinine bihydrochloride gr. xv. was administered hypodermically, as well as quinine bisulphate, gr. x. t.d.s., and cardiac stimulants by the mouth.

I suspected that the old lesion in the left lung was tuberculous and had been lighted up again by malaria, and that tubercular meningitis had supervened. However, the only course open to me was to get rid of the malaria parasites, nnd I therefore resorted to hypodermic injections of quinine.

On May 29th the patient was paralysed down the right side, had lost control of his sphincters, did not speak, but could be roused to pay attention. The following day "Cheyne-Stokes" breathing was noticed. The patient gradually sank and died on the evening of June 2nd.

A *post-mortem* examination was made about fourteen hours after death. The following notes were made:—

Thorax.—Pericardium and heart normal; adhesions of both pleuræ. On the right side slight adhesions in front, with several enlarged glands in the intercostal spaces; massive adhesions and thickening of left pleura; both parietal and visceral layers on the posterior wall were as thick as a kid glove. Right lung, normal; left lung, lower lobe carnified, with a few small cavities at the base, upper lobe slight compensatory emphysema at the extreme apex; a few miliary tubercles at apex. A large abscess cavity, containing about 4 ounces of thick, curdy, yellowish-white pus, was found behind the left pleura in the region of the tenth and eleventh dorsal vertebræ.

Abdomen.—Mesenteric glands slightly enlarged, no caseation found; intestines, omentum, stomach and kidneys all normal; liver, normal; spleen dark chocolate colour, soft and friable. No malarial parasites were found in a smear taken from the cut surface of the spleen. The appendix was very long, and bound down near the tip by a peritoneal band.

Cranial Cavity.—On opening the skull the membranes and convexity of the brain appeared normal; the membranes were not inflamed nor adherent. On lifting out the brain, however, some gelatinous matter was found at the base in the region of the quadrilateral space. On cutting into the brain a few miliary tubercles and a small abscess cavity were found in the temporo-sphenoidal lobe on the left side.

A CASE OF TETANUS.

By Major F. W. BEGBIE.
Royal Army Medical Corps.

The following report of a case of tetanus is forwarded in the hope that any officers of the Corps who have had successful cases under their treatment would kindly state the methods they used for the serum injections. Whether intra-cranial, intra-spinal, or, as used in this case, subcutaneous into the cellular tissue.

The case is interesting for two reasons: (1) The length of time, twenty-seven days, which had elapsed since the wound of thumb was received. The hernial wound was carefully examined for a bead of pus, after the onset of tetanus, but no sign of any inflammation could be found. (2) That after the onset on December 11th, when the spasm of the jaws and risus sardonicus were both well marked, the tetanic spasms were confined absolutely to the muscles of the neck and back, the face and jaw muscles remaining flaccid.

The patient, No. 62323 Private W. M., "F" Battery, Royal Horse Artillery, aged 19, service three months, scratched his thumb on his saddle while vaulting off his horse at Ipswich on or about November 14th. The injury was slight, and he took no notice of the accident. A few days later he injured himself again in the same way, and tore open the original scratch. He reported "sick" at the hospital, and had his wound antiseptically dressed. Two days later the wound was swollen red, and painful; he was seen by the medical officer, who incised the wound and let out a free discharge of pus. He was kept in hospital and transferred on November 21st to the military hospital, Colchester, to undergo an operation for radical cure of right inguinal hernia. On seeing the case I declined to operate until the wound in his thumb had healed. This it readily did under treatment, and the operation for hernia was performed on December 1st, 1910. The operation was done in the usual way, and gave rise to no complications, the sutures being removed on the seventh day, when the wound to all intents and purposes was healed, and the patient looked upon as convalescent, requiring only complete rest in bed. The catgut used in the operation was prepared by the xylol process, and the skin in the neighbourhood of the operation wound was painted, both before and after the operation, with iodine.

On December 12th the patient complained of stiffness of the jaws and pains in the neck. I at once gave him chloroform, and was then able to forcibly separate his jaws. As tetanus was suspected, 20 cc. of antitetanic serum were injected, and the patient was placed under morphia, removed to an isolation ward, and kept at absolute rest in the dark. At 5.30 p.m. on the same day he was seized with great difficulty in swallowing, and increased pain in the neck. Counter-irritation was tried, and a further 20 cc. of antitetanic serum were injected into the cellular tissue of the abdomen. He was again given chloroform, under the influence of which his stomach was washed out with a tube, and a meal of eggs, brandy, lemco, and milk was given. He had a fairly good night, was sensible, and free from spasm.

December 13th.—There were slight spasms of the face and neck during the morning; he was given another 20 cc. of serum at 11 a.m., and again at 6 p.m. He was also given chloroform, and fed through the œsophageal tube, 40 grains of chloretone and brandy being mixed with his food. He rested quietly for the remainder of the day until 11 p.m.,

when he had several attacks of pain in the back of the neck, and some stiffness of the muscles of the back. He was given another 20 grains of chloretone in milk, which he swallowed without any spasm appearing. After the drug he slept quietly till morning.

December 14th.—At 10.15 a.m. the patient had a sudden and violent seizure. He became perfectly rigid, the muscles of the face were contracted, the spine arched, and he rested entirely on the occiput and heels. The spasms lasted for a minute or so, and gradually subsided. During the spasm his face became blue, and his breathing impaired. The abdominal muscles, especially the rectus, were hard and "board-like."

These attacks of spasms continued at frequent intervals during the morning, but with less severity than during the first attack. He was kept under chloroform more or less all day, and fed with the œsophageal tube, a large dose of calomel being also given. This acted freely during the afternoon; 20 grains of chloretone were given both morning and evening with considerable benefit as regards the spasms.

December 14th, 3.15 p.m.—Being unable to pass his urine it was drawn off by catheter under an anæsthetic. The pulse-rate ranged from 100 to 110, and the respirations from 20 to 28. The temperature up to the evening remained normal. During the remainder of the day and also during the evening, he had repeated tetanic convulsions, and was kept under the influence of chloroform all day. At 11 p.m. his temperature began to rise, and reached 101·6° F.; pulse 136, feeble in character; respirations 36. He was fed and stimulated frequently during the night.

December 15th, 8 a.m.—Temperature 104° F.; 40 grains of chloretone was given in the food; double doses of antitetanic serum were injected and digitalis and strychnine were also administered.

9.15 a.m.—He had a very severe spasm, with complete opisthotonos. lasting fifteen minutes, followed by profuse sweating and feeble pulse, The other spasms during the morning were less frequent and less severe, lasting only a few seconds; and it was hoped that the increased dose of chloretone was having effect. He was fed by the tube again at 3 p.m. and 7 p.m. Given digitalis at 3.30 p.m. At 4.30 p.m. a fresh series of spasms set in, and chloroform and morphia were administered. During the evening another 40 grains of chloretone was given with the food, and 30 cc. of antitetanic serum injected.

At 7.15 p.m. his pulse was weak and feeble, and the temperature had fallen to 102°. F. Digitalis and brandy were administered. He had a quiet night; the bowels acted involuntarily; he perspired freely all night; and was warm sponged.

December 16th, 8 a.m.—Temperature 102° F., pulse 150, respirations 32 at 6.30 a.m. Convulsions very slight up to 9.30 a.m.; he was fed at 8 a.m., and 20 grains of chloretone were given. Restless from 9.30 a.m. to 10.30 a.m., when a violent series of convulsions with complete opistho-

tonos set in, during which he died of heart failure, the temperature rising to 104° F.

This case is remarkable for the length of time which elapsed between the cut on the thumb on November 14th and the onset of the symptoms on December 11th, an interval of twenty-seven days. The usual maximum interval is fourteen days.

Great hopes were entertained of the patient's recovery, as he stood the heroic treatment splendidly for nearly five days, but suddenly collapsed just before the close of the fifth day.

Travel.

ABRIDGED REPORT OF A TOUR FROM FREETOWN TO MONROVIA THROUGH THE PROTECTORATE OF SIERRA LEONE AND LIBERIA.

By Major A. PEARCE.
Royal Army Medical Corps.

General Information.

Time of Year.—I was travelling in Sierra Leone from February 23rd to April 19th, 1909. On the latter date I crossed the frontier into Liberia, and remained in that country until May 25th, 1909.

The Route.—From Freetown to Kennemma, the journey was performed by the Sierra Leone Government Railway, but thence to Monrovia on foot, except for about twenty miles, when a hammock was used.

The road traversed first passed in an easterly direction to Mallema, and thence in a south-westerly direction along the Morro and Mano Rivers to Fairo. After crossing the Mano River into Liberia at Gene, the direction was north-east to Da, and then east to Bopu. From Bopu to Monrovia the direction was slighty west of south.

Roads.—From Kennemma to the Moa River, I traversed a road still under construction but even then much used. This is one of the many roads which, under the enlightened administration of the Governor, His Excellency Sir Leslie Probyn (then Mr. Leslie Probyn, C.M.G.,), was being opened up throughout the Protectorate of Sierra Leone. These roads promise to be of much service to inhabitants of the country, and to afford the much-needed increased facilities for the development of trade with the interior. After

leaving the above-mentioned road, no other similar road was traversed until within some twenty miles of Monrovia in Liberia, where I passed through extensive coffee estates and the roads are constructed for wheeled traffic. The greater number of the roads traversed were native roads, sometimes mere tracks, badly kept and much overgrown. This frequently renders them difficult for hammock transport by four bearers, but there are very few places where hammock transport by two bearers is not possible, though perhaps difficult and tedious.

The Country.—The country, after leaving Kennemma, is slightly hilly and undulating. The hills are low and the gradients easy, but the further one goes eastward towards the frontier the higher the hills become. The gradients are in some places very steep, and the marching in consequence more trying both for Europeans and natives. From Mallema the hills are high, but their height gradually diminishes the further one proceeds down the Mano on the Sierra Leone side.

The Bush.—Throughout the whole route the hills were covered with "bush," except where cleared for cultivation in the neighbourhood of the towns and villages. No grass country was passed through except near Fairo and Monrovia. The low bush is dense and practically impenetrable; it grows to a height of some 15 to 25 feet and covers the low hills, but gradually disappears the further one proceeds, until the vast virgin forests are reached. These forests, "big bush" as the natives call them, consist of magnificent trees of great height and girth, among which the cotton tree is perhaps the most striking and imposing. The undergrowth here, though abundant, is not dense except in the swampy parts of the valleys. Small clearings for a night's camp can readily be made. Marching through the "big bush" is much cooler than marching through the low bush, as excellent shade is afforded by the higher trees, so much so that I have on many occasions walked the greater part of the day without a hat of any kind. It is seldom possible, however, to get a view of the surrounding country. When one does happen to do so from the top of the hill or ridge, the view is most thrilling and awe inspiring, and one cannot help being struck by the magnificence, vastness, and solitude of the forests, as they lie before one, covering range on range of hills as far as the eye can see.

Population. — The country generally may be described as populous and especially so in the vicinity of the coast and big rivers. In the Gola country of Liberia, however, long distances

(20 to 30 miles), may be traversed without a sign of habitation being met with.

Soil and Materials. — The soil throughout the "big bush" country appears to be of a loamy nature, though in places stretches of clay and sand are met with. Laterite rock is sometimes met with, though the sub-soil and underlying rock appears more often to be a kind of grey granite. It seldom however comes to the surface, the covering of soil being in most places of considerable depth. In many places, I noticed extensive outcrops of quartz on the surface of the ground which may be auriferous, but I saw no gold. Judging by the colour of the quartz seams and pebbles in some streams, iron appears to be fairly abundant. The nearer one is to the coast, the more continuous does laterite rock and soil appear to be.

Agricultural Products.—The oil palm is more or less abundant everywhere. Rice is cultivated everywhere, and could be obtained in varying quantities at nearly all the towns and villages. Cassava did not seem to be much cultivated by the natives living in the neighbourhood of the "big bush" forests. Sweet potatoes and peppers were common. I saw very little cotton and that mostly in the Niama and Mallema districts. The indigo plant was to be seen growing close to many of the villages, its dye being practically the only colour used by the natives. Rubber is said to exist in the forests along the Morro River, but I did not come across any myself. In Liberia, however, I saw it in several places, notably around Da. I also saw fresh rubber brought into Tappoima.

Bananas, plantains, pumpkins, and papaws are to be obtained in most places, especially in the larger towns; oranges and pine-apples are also met with, though less frequently. The latter appear to grow wild in the bush.

Palm wine is a very favourite beverage with all natives, and in the unfermented state is a pleasant and refreshing drink. It is obtained from the palm by cutting away a small portion of the outer part of the stem of the tree and making a hole into its interior. Out of this aperture the sap oozes and is collected in bottles or gourds. It is drunk without any further preparation.

A kind of tobacco is grown at some villages and towns. It is used for smoking and for making snuff. The natives, however, prefer imported leaf-tobacco for smoking; and in villages and towns off the beaten track it is a very useful article to have by one, being much more appreciated than money. Nearly every native—man, woman, or child — smokes, one pipe doing duty among many

persons, being passed on from one to another, each taking a few puffs at it.

Native Manufactures.—Soap: In some places a kind of soap is made by mixing melted elephant fat and wood ash together.

"Country" cloths, of cotton grown and prepared locally, are made in many places; the women prepare the thread and the men do the weaving.

Hammocks made of grass or fibre are to be found in a very large proportion of the houses of all villages and towns, but I only once saw them in process of manufacture—viz., at Maiengema.

Fishing nets and fishing tackle are made from what appears to be a species of grass. The leaves of this grass are some 2 feet long and about 1 to 1½ inches in breadth at the broadest part. They are cracked across and the longitudinal fibres drawn out, and then rolled between the hand and thigh into strands of the required thickness.

The live stock kept by the natives consists of cattle, sheep, goats, pigs, ducks, fowls, dogs, and cats. I did not see any horses or ponies. Cattle are scarce and seldom more than two or three in number, even in the towns where they are found. The headman at Niama told me that he lost a lot of cattle through sickness, probably trypanosomiasis. Sheep are not common, though many of the towns and villages have a few. Goats exist everywhere, and I do not remember having passed a single village where either some goats or kids, or their droppings, were not seen. I once tried to obtain some fresh milk. I was unable to do so, however, as the natives were afraid to milk the cows (these animals are generally in a semi-wild state) and were unable to extract any from the goats, neither they nor the goats being accustomed to the process of milking. Pigs are practically non-existent. Ducks are scarce, but a few, never more than half a dozen, were seen at one or two of the larger towns. They were fine birds of the Muscovy genus. Fowls exist everywhere, and there was seldom a village or fakkai, however small, where I did not obtain at least one, by purchase, when required. It is, however, more difficult to obtain their eggs, as the people are very reluctant to part with them, saying, very truly, that if they sell the eggs they will not have any fowls.

Dogs: Every village has its dogs; they are as a rule dirty, mangey animals. They appear to live entirely on such offal and filth as they can find in and around the villages, and are apparently kept as scavengers.

Cats are found in most villages: they are often in a semi-wild state, but sometimes are made great pets of. There does not appear to be any natural animosity between the cats and the dogs, and they mix together freely.

Wild Animals, Birds, Insects, &c.—The forests and bush generally are full of all sorts of animal life, but owing to their vastness and the difficulty of getting through them one sees very little when on the move. If, however, one remains quiet for a time it is surprising how much one sees, especially of birds and insects. Elephants, found in the forests, are hunted by the natives, who kill them, I think, as much for the food they provide as for their ivory. The people are very fond of their flesh and eat practically the whole carcase, except the bones. The natives describe four varieties of elephants; the description, so far as I could gather, being based on the size of the animal. The largest variety is called "bini" by the Mendis. The smallest variety is said to be very small, even when fully grown, but to have comparatively large tusks. Bangles and anklets made from the hide or pads of elephants are often worn by the natives. They make rather interesting and, when studded with silver points, pretty ornaments. Leopards are plentiful but very rarely seen, though one often comes across their spoor, and occasionally hears them at night. At several places I saw traps which had been erected to catch them. At many of the villages the goats and sheep are shut up at night in big shelters for protection against these animals. A leopard's tooth worn by a native is a sign that he is "free-born."

Duiker and "bush goat" are numerous in some parts. They are both trapped and shot by the inhabitants. These animals are attracted by a peculiar sound made by the natives with a hollow reed. The hunter sits down in a favourable spot and, emitting the sound at intervals of about a minute, waits until the animal comes. If the man knows his ground he seldom fails to obtain a shot.

The "bush cow," or "reindeer," of these frontier forests are apparently the Bongo. They live in dense forest and are very shy.

Pigmy hippopotami are called "mari" or "mali." They do not appear to be numerous, and are very shy and difficult to find. The natives seem to have a superstitious fear of them, and dislike looking for or tracking them.

Wild swine occur in fair numbers, and their flesh is much liked by the natives. Civet cats, known as "bush cats," are common. Monkeys abound in this part of the country. The

sound of a troop feeding or going through the trees is often difficult to at once distinguish from that of elephant feeding.

Crocodiles abound in all the big rivers. Their flesh is eaten by the natives.

Guinea-fowl are often met with in the "big bush" forests. They are shy and wary, and it is seldom possible to get a shot at one. They are generally found in flocks or coveys of from eight to twelve. I found one of their nests. It contained eight eggs, and was built on the ground at the foot of a cotton tree, being neatly concealed between two of its projecting buttresses, which were partially overgrown with creepers and brush-wood.

"Bush-fowl" are occasionally seen in dense forests far from human habitation or cultivation of any kind. They run at a great pace and soon disappear in the undergrowth. They build on the ground at the foot of moderate-sized trees, without any attempt at concealment. I saw two nests: one had three eggs in it but the other was empty.

Kites are great pests and work terrible havoc among the young fowls, and the villagers frequently complained to me about them. It is interesting to watch the mother of a brood of chickens keeping a careful look-out for these birds, and to see the rush to a place of safety, which takes place when one is seen on the wing, or on hearing the peculiar shrill cry which the cocks give by way of warning of the approach of the enemy. This cry is easily recognised, and is known as well to the villagers as to the fowls themselves. It is the signal for a general shouting and waving of arms by those in the vicinity. I shot several of these birds, always much to the delight and gratitude of the inhabitants, both on account of getting rid of the pest and because they are "good for chop" (good eating).

Butterflies are plentiful everywhere. Many of them are of great beauty. Moths are seldom found in great numbers. In some parts, especially in "big bush," I was much struck by the fact that they were practically non-existent, or at any rate rarely seen.

Tsetse and other biting flies exist practically everywhere. They are most annoying and troublesome pests. Ticks are plentiful, but seldom cause much annoyance except to animals. Scorpions do not appear to be numerous. Ants abound everywhere, the varieties which are most common being the driver ant, the red tree ant, the white ant, and a small brown variety generally to be found among one's food supplies, especially those of a sugary

nature. The driver ant is a great pest and much disliked by the natives. It is interesting to watch these insects when they are on the march or foraging for food, and to see how they surmount every obstacle and devour whatever they fancy that comes in their way. They can only be turned in their course by fire or by beating the ground with heavy sticks. The red tree ants are a source of annoyance only when disturbed or knocked off trees while passing. Both the driver ant and the red tree ant give very painful bites, the irritation from which lasts several days. The white ant does not appear to bite or to attack animal or insect life.

Climate.—In spite of the fact that I travelled during the so-called dry season a very considerable amount of rain fell. This was exceptional, from all accounts. Rain fell on twenty-three days in March, and nineteen days in April and May, giving totals of 15·85, 6·8, and 13·25 inches of rain respectively in these months. The amount was calculated approximately and not by rain gauges, and there were days in each month on which no records were taken. The records, incomplete though they are, give some idea as to the amount of rain which fell, and the character of the climate in these parts during this particular period. There was one day (March 7th) throughout which the Harmattan wind blew. It often blew during the mornings in March and April.

As a result of the heavy rains camping out in the bush was made most uncomfortable, and marching at times difficult owing to the swollen state of the streams and rivers.

"Bush" shelters are seldom rainproof until they have been in use for some days. I found the best means of preventing a new shelter from leaking excessively was to light a large fire in the centre of the shelter and to keep it burning as long as the rain continued. The shelters are built by cutting down several small trees, and, after having lopped off the branches, driving the stems into the ground some 8 to 12 inches. Lighter branches or stems are then fastened horizontally to the uprights by means of "tie-tie," and the sides and top covered with palm or banana leaves, or, if these are not available, branches of other trees which have large leaves. The "tie-tie," when a young or slender creeper is used, is simply bent and wound round the poles, which have to be fastened together—if, however, thick "tie-tie" creeper stems are used they are beaten and split up into long strips, which are then easily manipulated. The smaller kind of creeper is used by the native for tying up loads, &c.; in fact, for any purpose for which more civilized people would use rope.

Rivers and Streams.—Nearly all rivers above 100 miles from the coast, except the largest ones, are fordable in places during the dry season. The rise and fall of rivers and streams is often very sudden and rapid. On one occasion, while on the march, I was caught in a tornado accompanied by heavy rains, with the result that streams and rivulets which, under ordinary circumstances, were only a few inches to a foot or so deep were in an hour or two converted into rushing torrents knee or waist deep.

While in the neighbourhood of Yandahun I noticed that the Morro River fell about 2 feet in twenty-four hours, and in the succeeding twenty-four hours again rose 3 feet, and then in the the following three days fell nearly 5 feet.

Bridges are built either on the suspension (hammock bridge) or trestle system. The former are made entirely of logs of trees or bamboo tied together and suspended by means of several strands of strong creepers or vines between trees or rocks on either bank of the river. "Canoes" or "dug-outs" are of various sizes; the larger ones are made from cotton trees and the smaller ones from trees of smaller size. They frequently leak, and owing to the small size and rough construction of some of them the crossing of rivers is often by no means devoid of risk. Rafts are constructed from the trunks of a tree called "Guvoi." The wood is soft and light and the natives say it is the only tree that can be used for the purpose as all others sink. At nearly all crossings of the rivers, whether by bridge or boat, there is also a ford which is used during the dry season when the water is low.

Diseases.—The natives everywhere seem to have great faith in the power of the "white man" to cure disease, and in nearly every place where I remained a day or so some sick person came or was brought to me for treatment. With the limited supply of medicines and dressings which I had taken with me I was not able to do much, but I always found the people most grateful for anything that was done for them.

Fever, usually described by the patient either as "My belly hurt me, sar," or "My head do hurt me, sar," was readily amenable to a smart purge and some 20 to 30 grains of quinine, in 5- or 10-grain doses, according to the severity of the case.

Constipation was generally cured by 3 to 5 grains of calomel or a rhubarb pill; both were in great request at all times.

Conjunctivitis was generally easily cured with a weak boric acid lotion.

Wounds.—Those most commonly met with were cuts, lacerated

and contused wounds, abrasions, and evulsions of nails of the lower extremities. These were generally due to injuries received while walking along rough roads, or when working on the farms. They heal up very quickly and readily, under a simple antiseptic dressing of boric powder and lint or wool.

Some of the sloughing sores and ulcers which I saw were very disgusting and foul, being generally the result of neglect or "country medicines," or both. A marked improvement was usually effected by thoroughly cleaning them, and the application of antiseptic dressing.

Earache and Deafness.—Much gratitude was gained in a case of earache and deafness, apparently due to collection of cerumen in the ears. The wax was moved by syringing, and the patient so enjoyed the proceeding that I was requested to continue it after the wax had been removed, and subsequently to repeat it, apparently on account of the novel and pleasant sensation which it appeared to give the patient.

Keloid.—I saw one or two cases of this disease. One of these, about the head and neck, was in a most foul condition. The stench from it was most offensive and sickening, so much so that the patient was continually holding his nose to avoid the smell.

Retention of Urine.—On one occasion, one of my carriers came to me for treatment for retention of urine due, apparently, to stricture (organic). Not having any catheters with me, I advised hot fomentations and sitting in a large basin of hot water, in the hope of giving relief before resorting to other measures. A short time afterwards, he came back and asked me for some money to buy "country medicine," as a man in the town said he could cure him. I gave him the money (four shillings) and he got the medicine. Some two hours later, he came to me again and said he was quite well, and had passed his water freely. I was never able to discover what the "medicine" was which cured him, as the man who had given it was unwilling to disclose the secret.

Craw-Craw. This appears to be a general term applied to any skin affection by the natives of the coast. They say it is caught in the bush and often caused by a minute species of tick (?). Certainly, when continually going through bush, as one does when shooting in this country, the skin of the exposed parts of the body, especially the back of the wrists and hands which are used in pushing aside branches and small trees, become very irritable, as I found from personal experience. This scraping of the skin against branches, damp clothing and excessive perspiration may be

the sole cause of the irritation, but I think not, as personally I found much relief was given by rubbing the part affected with an ointment of sulphur and camphor which I took with me. The natives themselves, after they have been going through bush or clearing ground for their farms, very commonly smear their legs and even the whole body with a preparation made from a white clay, which is found in many parts of the country. The reason they gave me for this procedure was to prevent "craw-craw" after being in the bush. There is, also, the custom of smearing the bodies of bundu girls and poro boys with this white clay, on the termination of their period of seclusion in the bush. Though this custom is apparently now regarded as part of the religious ceremony, I think the origin of it was probably purification and disinfection.

With regard to the small ticks (?) above mentioned, they are undoubtedly the cause of much irritation, and being extremely small, are difficult to detect and detach once they have firmly embedded themselves in the skin. They have generally to be picked out with the point of a knife, the act of removal being by no means pleasant. They are much dreaded by the natives, and from my own personal experiences apparently with good reason.

Sleeping Sickness.—I did not see any cases of sleeping sickness. I made frequent inquiries about the disease, but it was only at Fairo that it seemed to be known. Here the Chief, who is a better class of Mohammedan than is generally met with, and a well-educated and intelligent man, informed me that cases often did occur, though he knew of none at the time.

Rheumatism.—This disease, in the chronic form, appears to be rather common among the middle-aged and older people. I do not know what treatment, if any, is employed by the people of this part, but among the Limbas, in the north-west part of Sierra Leone, the partially-digested food (grass, leaves, &c.) from the stomach of a hippopotamus is considered a specific. I have seen men and women treading in the contents of the stomach of a hippopotamus, and smearing it over their legs, the reason given for so doing being that it was good for this disease.

Goitre.—I saw no case of goitre in this part of the country, mountainous though it was, but I know it does occur in other parts of the Sierra Leone Protectorate.

Hydrocele (?)—A man followed me one day and asked for some medicine for an enormously enlarged scrotum. He also complained of getting fever every day. I could do nothing but give him some quinine and advise him to go to Monrovia, when he got the

opportunity, for operation. I have put the query after hydrocele as I was not at all sure that it was one. There appeared to be fluid in the swelling, but as to the probable nature of the fluid I should not like to offer an opinion. The tumour had none of the characters of elephantiasis, except its great size.

Molluscum contagiosum.—This I saw in a child. The body of the child was covered with it, and especially the sides of the chest, and inner parts of the arms in the neighbourhood of the axillæ. I was anxious to confirm the diagnosis by removing the contents of one of the nodules but the mother objected. The child was apparently in perfect health.

Sanitation.—As a rule there is none, except, perhaps, the occasional sweeping out of houses and clearing the ground round them, and then depositing the refuse thus collected in a selected spot in, or just outside, the village. On one or two occasions I was, however, struck by the care exercised to keep the drinking water supply free from contamination. At Niama there was a recognised place, with a log to stand upon arranged over a small swampy stream, used as a latrine by the inhabitants. It was practically an open cesspit, which was continually discharging its liquid into the stream. This place was below the town and away from the source of supply for drinking water. At Tappoima the people of the town, of their own accord, prevented my boys from making a temporary latrine in a place they (the boys) selected, because it was too close to the stream where the drinking water was obtained. At most places, where attention was called to this matter, I noticed either that the drinking water was obtained from a stream distinct from that where the bathing and washing were done, or at a point higher up, if there was only one stream or river available. Possibly this natural aversion to fouling drinking water may to some extent account for the fact that bowel complaints are comparatively rare in the tropics of the West Coast.

The Muriman.—The chief attributes common to all those I have met is the undoubted influence they exercise over the superstitious minds of other black men, some connection with, or belief, however small, in the Mohammedan religion, and a greed for money. They are found among traders, itinerant or otherwise, hunting men, chiefs and headmen, boys and followers, teachers, and even those who have apparently had some education on European lines, and possibly been baptized Christians. Their influence is certainly great, and it is increasing among the tribes of this part of the West Coast. It is good in so far that it is a means of education, but bad

in that it gets and maintains its power by taking advantage of natural and inherent superstition of the natives to gain its own ends.

Their influence on the whole is against the European, and I think it is an influence which will before long make itself much felt. It appeals to the natives by permitting slavery, polygamy, and not interfering with and very possibly countenancing customs, manners, and secret societies which are viewed with abhorrence by civilised peoples. The Muriman is, perhaps, best described as being a hybrid between a Mohammedan and a pagan, having the vices of both and few or any of the good qualities of either. He is a very different stamp of man from a properly educated and true Mohammedan.

Knowledge of Native Languages.—The slight knowledge of the Mendi language which I had acquired proved most useful. It enabled me to understand much of what was said and what was going on, and also one was not always dependent on an interpreter when asking for information, &c.

Dancing.—I always found the natives, even in the smallest villages, fond of dancing; I witnessed several dances. The principle seems very much the same all over the country. The music is produced by the beating of cymbals and drums, while the women clap their hands in time with the music. In the Mendi country some of the women also play the seghura. All the performers and many of the onlookers sing (?) a monotonous chant, repeating the same words over and over again.

The performers form a kind of circle, and first a man leaves his place, runs across towards a woman, and then darts back again to his place; the woman next does the same. Repetitions of this constitute the chief part of the proceedings. Sometimes a man rushes out into the centre of the circle, throws himself about frantically for a minute or two and then goes back to his place. All the movements are done keeping time to the music. At times they get very excited, but usually it is rather a solemn performance.

Presents.—The custom of bringing presents to a person arriving in a town is still kept up in Sierra Leone. At practically every town or village where I stayed, and often where I only halted, a present was brought me, generally in the form of one or two fowls and some rice, and sometimes also a sheep, bananas, or oranges. Something equivalent in value was always given in return and is expected.

In Liberia the proceedings were generally the same, but at

Tappoima I discovered that not being in my own country I was expected to give the first present. This I did and got something in return but certainly not the equivalent! However, it was meant to be a friendly act and was taken as such.

Method of Showing the Way.—A very good idea of the direction in which any town may lie can be obtained by asking a native to point towards the town. Distance, provided the person has heard of, or been to, the place, makes little difference. I generally found the direction shown was correct.

If on the march one of the leading party, on arrival at a point where the road divides, generally places a branch across the road that is not to be taken by those following. This is called by the natives "blocking the road."

When wandering through bush, which has not to be cut through, away from the roads, the line taken is marked by bending over and breaking the tops of the stems of the undergrowth, by cutting off the tops of stems or projecting ends of small branches, or by slicing off pieces of bark from the bigger trees. This latter is generally used when a sudden and permanent change of direction is made.

Sierra Leone.

I left Freetown by rail early in the morning and reached Kennemma about midday on the following day.

Kennemma is the headquarters of the newly-formed Railway District, and while there I received much kindness and hospitality from the District Commissioners, Mr. Bowden and Captain Davies (West African Regiment). After leaving Kennemma the first town of importance which I reached was Giema. The town was full of people assembled to perform funeral rites over a man who had died the previous day, and in consequence there was much noise, beating of drums, dancing, and wailing throughout the night. Shortly after my arrival a Bundu girl was carried into the town on the back of a woman and deposited in a large Barri amidst much cheering and excitement. I found on inquiry that she had just completed her time in the bush and been brought home to her people, but that before she could mix with them she would have to remain three days and nights under supervision in the Barri where she could be seen by everyone. After that she would be free to go where she liked or to her husband if she was to be married. At this town I was delayed several days by an attack of fever, the only one I had during the two and a half years I have spent on the

coast. After leaving Naima the country became more hilly and big bush forests more continuous.

The next important town I reached was Mallema and there I remained three days. The people of the town from the chief down were very partial to tea, sugar, and salt. When given a lump of sugar the recipient would break it up and divide it among several of his or her companions. All appeared to relish their little bit very much, and endeavoured to make it last as long as possible by slowly licking it. When it had disappeared they carefully sucked their fingers. The chief and his old mother thoroughly enjoyed a cup of tea, and each came once or twice a day to ask for it. The old lady preferred it sweet, and when the cup was emptied scraped out any sugar that remained at the bottom with her fingers, which she then sucked.

While staying at this town I wandered one day into a Poro bush where were several boys who were just completing their period of seclusion. I found them seated round a large fire roasting chickens on stakes. At first they appeared frightened at seeing me. The court messenger who was with me, however, told them there was nothing to be afraid of, and they were soon at their ease and continued their cooking operations. No women are supposed to visit these abodes of the Poro boys. Seeing one there I asked why she was there, and was informed that she was a Poro woman, *i.e.*, a woman who for some reason or other has had to be initiated into the mysteries of this society. The "big" (head) Poro man was also present. On my pointing to the marks on one of the boys and making a sign indicating that pieces of flesh had been torn out, he with much glee produced a small dirty and rusty piece of iron, shaped like a large fish- (unbarbed) hook, from a hole in the trunk of a large tree. With this he demonstrated how the scars were produced by imitating the process on one of the people standing by. He also showed me the knife with which the operation of circumcision was performed; it was blunt and rusty. It is wonderful how an instrument of the kind could be utilized for such a purpose.

The country round Mellema is very hilly and the hills are covered with big forest trees. The road to the next town, Tungi, is rough and steep in places and crosses several high hills. I made it my headquarters for a few days while making excursions into the bush towards the Liberian frontier. The surrounding country is hilly and densely wooded. Round the town there is much cultivation, and in it there were half a dozen head of cattle and a score of sheep.

On one of my excursions towards the Liberian frontier in this neighbourhood, while resting after having had lunch, my hunting man said to me, "Why master no fear?" I said, "What is there to be afraid of?" He replied, "Master only one white man and black man plenty this country, look, five black man this place," meaning the boys I had with me then. I replied, "Master no fear black man, black man no hurt white man when white man no hurt black man, and master no want for hurt black man." He said, "Black man no sabby white man. Black man fear too much, dey fear black man when they go another black man country." The above is a good illustration, I think, of the opinion of the native generally regarding a white man and men of his own colour, if unknown to him. Any sign of anxiety on the part of the white man is quickly appreciated by the natives, and, if they are unfriendly, promptly acted upon.

My original intention had been to strike across the Gola Forest in a south-easterly direction and thus get into Liberia, but I abandoned this plan owing to the difficulty of getting together sufficient supplies for my carriers.

Leaving Tungo I went in a south-westerly direction, the road following more or less the course of the Morro River, and passing through several villages, until Yandahun was reached.

Yandahun is a town of about a dozen houses, and is situated on the left bank of the Morro River, 1½ to 2 miles above its junction with the Bewa River. The village is clean and well kept. Here I remained several days while making preparations for crossing into Liberia. I also sent about half of my carriers to Hanga (a town on the railway) to buy rice and get other necessaries, including money, from the French Company's Stores there. It is, I think, remarkable how reliable one's boys and followers generally are in executing messages, even where money is concerned, when travelling in these parts. I have repeatedly sent a carrier or hammock-boy long distances for or with money up to £10 or £15, and have never, on any single occasion, lost a penny of it, though had they bolted or said some got lost, I would probably never have been able to recover it or find them.

As the Liberian authorities on the other side made difficulties about my crossing in the neighbourhood of Yandahun, I went to Fiama to arrange for letters being sent across to the officer in command of the nearest Liberian frontier post, viz., Da.

Fiama is the headquarters of Madam Yunga, the paramount chieftainness of the Noma Section of the Mendi tribe. She is an old woman of about 80 years of age.

Madam Yunga was not in the town when I reached it. She arrived, carried with much state in a hammock, the next morning. She, with her headman, came to the house in which I was staying and we had a friendly interview.

It was eventually agreed that a man should be sent back with me to tell the sub-chief of Yandahun to provide a messenger to take the letters across to the Officer Commanding at Da (La) to be forwarded on to Monrovia. After an exchange of presents I started off for Yandahun, but, after going a short distance, found that the man who had been promised was not with me. I stopped and sent back one of my boys to ask for him. Instead of the man I received a note and a "jewel" (a horn, mounted in silver, on a silver chain). The note contained the information that when the sub-chief of Yandahun saw the "jewel" he would give a messenger to take the letters, and that then I was to send it back through him.

Shortly after arriving at Yandahun I sent for the sub-chief and told him, at the same time showing him the "jewel." He did not seem to relish the idea at all, but said he would do what was wanted, as the "jewel" showed that Madam Yunga had ordered it. Eventually three men went off and I handed the "jewel" over to the sub-chief to take back to Madam Yunga. Two days later the boys returned, having delivered my letters. The next day I left Yandahun.

The road from Yandahun to Gogorihun is not good in many places, but this is chiefly the result of want of use. It was much overgrown and a good deal of clearing had to be done to enable the carriers with their loads to get through.

Gogorihun, an extremely dirty and wretched town of twelve houses, is situated on rising ground about 200 yards from the Mano River.

While at Gogorihun I made several excursions along the river. On one occasion, following a track down the right bank, I came to a place where the river was evidently fordable when the water was low. Here I wandered about and found marks in the sand resembling those of alligators and leopards. They occurred singly or irregularly in patches without any other marks leading up to them, such as would be made by the animals prowling about, nor were they like the ordinary marks of these animals. There were also men's footmarks about, and these, on being traced up, led towards an island in the centre of the river. During my stay in the village an alligator was caught. There was some kind of ceremony

in which some of my boys took part the following day. I was not able to get more out of them than that it was "medicine," the country word implying a mysterious power either for good or evil. The impression left on my mind by this village and the people in it, and from the tone of the place, was that they were in some way connected with one or both of those secret societies, the "Alligator Society" and "Leopard Society," and that, probably, the marks seen in the sand near the island in the river had something to do with them. Some time afterwards, when making a suggestion to this effect to one of my boys, he said, "I think so, sar, dem bad man."

Leaving the place, I stayed a night at Wundi, a town belonging to the Makberri tribe. It was clean and nicely kept. I stayed the the next night at Gissiwaru, a large, dirty town, and full of Murimen of a low order.

From Gissiwaru I pushed on rapidly to Fairo, where I heard there was a good chief. Arriving here late in the afternoon, with only one boy, some three hours ahead of my carriers, I went at once to see the Chief, Besikaia. He received me most hospitably, gave me a comfortable house, and had food and a bath prepared for me while I was waiting for my carriers to arrive. I cannot speak too highly of the courtesy and kindness of this man. He did all in his power to help me. Being educated and intelligent, and a good Mohammedan by religion, I found him absolutely reliable, and a man of his word. During my stay in the town I had several talks with him, in the course of which he promised me a guide to take me to Tappoima, the chief town of the Gola country. I hope he may be well rewarded for his fidelity and loyalty to the white man.

At this place I saw for the first time a man in the stocks; he was undergoing punishment by order of the chief for some offence which he had committed. Here also, just outside the town, I discovered four old Spanish guns (cannon) which, I was informed by the chief, had been there for many years and had been brought from ships in the river near Gene, before the English came to the country.

On the morning of departure I made all my carriers fall in, and asked each one individually whether he would come with me through Liberia. Each in turn agreed to do so. Being satisfied on this point, I started off and got to the Mano River at Gene (New) where I crossed over.

(To be continued.)

Sport.

THE ELAND OF THE BAHR-EL-GHAZAL PROVINCE.

By Major H. ENSOR, D.S.O.
Royal Army Medical Corps.

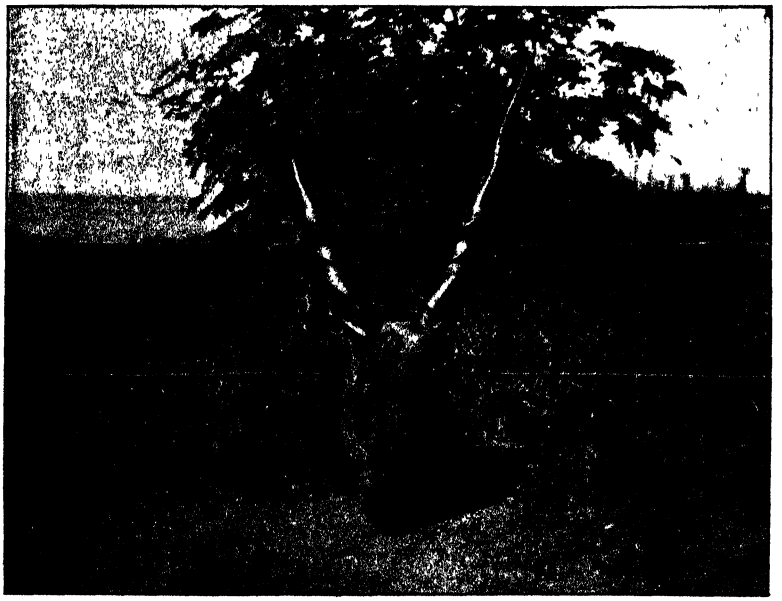
It is said, and with truth, that no place in the world is without its compensations for those who are able to appreciate them. This is eminently true of the Bahr-el-Ghazal Province of the Anglo-Egyptian Sudan. The climate is bad; the health of all serving therein is, as a rule, poor; for about six months of the year travel is almost an impossibility owing to the heavy rains, but the countless herds of big game which roam over certain parts of the province are an ample compensation to the British resident who possesses the sporting instincts of his race. It will be admitted, perhaps, by all familiar with the big game of the Bahr-el-Ghazal that the finest and most noble of them all is the "giant" eland. This species, which is known to science as the *Taurotragus derbianus*, is very much larger in every way than the eland of the Southern African provinces, the *Taurotragus oryx*. It is, moreover, a much rarer animal, and I believe it is practically confined to certain districts in Senegambia, Haut Ubanghi, and the Bahr-el-Ghazal Province. Certainly, until the Anglo-Egyptian occupation of the Sudan, specimens of the heads and horns of this species of eland were very rare in Europe, and even now are very uncommon. The British Museum, I believe, is still waiting for a specimen, but a much smaller collection of trophies in London possesses two specimens of the "giant" eland. I refer to our Mess at the Royal Army Medical College, which, through the kindness of Major Bray, displays in the ante-room two beautifully-mounted heads.

The first mention in literature of this species of eland is probably that to be found in Schweinfurth's book, "In the Heart of Africa," but the description and illustration given are much more like that of the South African eland. Possibly the one specimen shot by this author was a small, immature one.

The Bahr-el-Ghazal eland appears to be very local in its choice of a habitat, and this peculiarity is probably due to the fact that certain trees which are its favourite food are only to be found in

certain districts, and on this account the herds always remain more or less in the same areas.

Wau, the Fort Desaix of Major Marchand, which is now the capital of the Bahr-el-Ghazal Province, is fortunate in that one of these areas is situated only about 20 miles distant from it, and harbours a large herd of these splendid animals. This herd, which is naturally regarded as the special property of the British officers' mess, has supplied most of the heads which are now to be seen in Great Britain. Its existence is, however, now pretty



Head of a Bull Eland packed up for transport to Khartoum.

generally known to big game hunters, and very occasionally permission is granted by the Governor-General to some enthusiast to proceed to the Bahr-el-Ghazal for the sole purpose of shooting one of these animals. We also know where other herds are to be found in this province, but there is no necessity to advertise their whereabouts. *En passant* it may be of interest to mention that Marchand's fort, which he named Fort Desaix, has now been pulled down to make room for new Government buildings, but the Governor, Major Gordon of the Leicestershire Regiment, has preserved a portion of the walls, and has arranged for a tablet to

be placed on it to commemorate what was certainly one of the finest marches made by troops in the modern history of Africa.

This year up to the beginning of June, four bull eland had fallen to the rifles of different British officers and officials, and the sight of a very fine head obtained by the Governor decided me to proceed to the eland country before the rains became too heavy, and to try to shoot one, if possible, larger than that killed by Major Gordon. I had already shot one of these animals in 1906, but he was a most inferior specimen, and can be said to have been shot



A female Bahr-el-Ghazal Eland.

almost accidentally. The manner of his shooting was as follows: I had sighted a herd of eland, and, having marked down a huge bull as my prospective victim, had crawled up to the cover of an anthill from which I intended to fire. Unfortunately my stalking was only too good, as immediately behind the anthill lay another eland which I had not seen, and which was quite unaware of my proximity until I got on to my knee to take aim at the big bull. He then jumped up with a snort, and startled me so much that I instinctively shot him dead.

I was comparatively inexperienced in big game shooting in those

days, and the startling appearance of a huge beast only about three yards from me must be my excuse for shooting what was quite a small bull. This time I determined to do better, and having obtained the necessary leave of absence, I set out from Wau on June 11th, for the eland district, accompanied by my servants who went not willingly, but of necessity, as they could see no use for a journey in the rainy season. I arrived at the village of a local potentate, rejoicing in the name of Dud Majok, which is situated near the eland country, soon after mid-day in the middle of a violent thunderstorm, and was obliged to take shelter for the rest of the day in one of the native huts. These huts are waterproof, but unfortunately their only entrance is through an oval hole made in the mud wall, which is just large enough for a man, not a fat one, to crawl through on his hands and knees. This is a trying and undignified way of entering a house, and when about half way in, one is conscious of a feeling of helplessness, in the event of any native wishing to get his own back.

Early the next morning we arrived at the field of operations, where two of the natives, who held themselves to be full of cunning in all matters connected with the eland, met me and raised my spirits by informing me that the elands were as the leaves of the forest for multitude, and were to be found close at hand. I did not believe this, but hoped that perhaps some had been seen recently. That afternoon about 3 p.m., we sallied out and spent four hours looking for the numerous eland, and returned to camp without having either seen any, or even come across fresh tracks. We saw plenty of other game, including one herd of seven roan antelope, which I did not attempt to shoot. It is always advisable when after one kind of animal, to refuse to shoot any other big game you may chance to meet with. The natives, who are always willing to accompany a British officer on a shooting trip, are only after two things, and the love of sport is not one of them. They want meat and "baksheesh." If you give them the first, before you have shot the animal you want, they will gorge themselves and be practically useless for a day or two afterwards.

The next day was passed entirely in the forest looking for the eland, and again we saw neither the herd nor any fresh signs of them. A neighbouring village, however, sent in a deputation to say that the eland were so numerous and so tame near them that it was hardly an exaggeration to say that they would feed out of their hands. This was, of course, an attempt to persuade me to leave the village I was stopping at and to proceed to theirs, in which case they

would profit by any meat killed, and any "baksheesh" that might be going. This tale was met by my villagers with the news that one of them had that evening sighted a large herd close at hand, and that without doubt we should kill one on the following morning. Both tales being manifestly untrue, I decided to keep my camp where it was.

The next day, before dawn, we were out again in a fresh direction, and tramped for three hours over wide grassy plains dotted with clumps of trees. At 9.30 a.m. we came on the fresh tracks of a small herd of eland, and these, the wind being favourable, we were able to follow up with all speed. About 10 a.m. we sighted the herd, and made out nine animals, all of whom the natives with me insisted were bulls, stating that at this time of the year the cows, together with their newly-dropped calves, herd apart from the bulls. This may be so, but I had never heard it before, and was very anxious not to shoot a cow eland by mistake for a bull—a mistake which it is very easy to make in thick country, as the horns of the females are very little inferior in point of length to those of the males.

After sighting the herd the real stalk began, and never have I had a harder one. The herd was standing in the shade of a thick grove of trees in the midst of a grassy plain, and the only means of approaching near enough to get a shot was by crawling through the grass on one's hands and knees. This is a most fatiguing mode of progression at any time, and when you have about half a mile to cover in this way at 10 in the morning in June under an African sun it is little short of horrible. However, it had to be done; so taking a ·400 double-barrelled rifle, which I always use when after heavy game, with me, I started to crawl through the grass accompanied by one of the native hunters. At first it was not so bad, but after about 200 yards the soil consisted of a kind of coarse gravel, and my knees suffered horribly; the heat was also awful, as not a breath of air could reach us owing to the long grass.

At last, however, we got up to within about 130 yards of the herd, but could only make out the heads of three of them, the others being more or less hidden by the trees. One of the three which were in full view appeared to have a magnificent head, and, after wiping the sweat out of my eyes and waiting until my wind came back after the exhausting crawl through the grass, I gently got on to one knee and fired at him. The welcome slap came back to me as the bullet struck the beast, and he staggered

and fell. Immediately, however, he got up again and rushed off through the trees, taking the same line as the other animals. We ran after him, and my feelings were unpleasant as I thought he might perhaps be only slightly wounded, and that I should lose him after all. It was not to be, however, as about 300 yards on we found the poor beast lying down and looking at us with the pathetic, questioning eyes of a dying animal. He had been shot through the lungs; the ball had entered behind the near shoulder, a little too low to traverse the heart, and on its exit had shattered the off shoulder joint. Another shot put him out of his pain, and on examining him he was found to be a splendid bull in perfect condition, the mane and tuft of hair on the dewlap being exceptionally long and thick. His horns measured 36½ inches in a straight line, being exactly 2½ inches less than the one shot by Major Gordon, and about 3½ inches less than the largest recorded head. His neck at its broadest part, including the dewlap, measured 29 inches, and his height was about 17 hands.

The Governor had given me permission to shoot another eland, if I should see a really good one, for the British Museum, but having obtained one at great expense of vital energy, and the loss of most of the skin of both my knees, I decided to be content. Fortunately I had with me a servant who is skilful in the proper manner of skinning the heads of buck, and I was able, with confidence, to leave this work to him and to return to camp, which I reached about 1 p.m., pretty thoroughly done up with the heat. The following day we returned to Wau with the trophies, and since then I have been using all the means at my disposal to preserve the thick, heavy skin of the head and neck, and succeeding but indifferently. Owing to the time of the year being the rainy season, it is very hard to prevent skins from decomposing, and much of the hair of the mane has already slipped, and I fear that all my taxidermist's skill will be required to mount the head and to preserve anything like the natural beauty of the animal. The photographs reproduced are those of two eland shot in the Bahr-el-Ghazal by Captain W. D. Kenny, Royal Inniskilling Fusiliers, who has been so kind as to give them to me for the purpose of illustrating this article. The photograph of the dead female emphasises what I have mentioned above concerning the difficulty of distinguishing the bulls from the cows.

Reviews.

THE FRONTIERS OF BALUCHISTAN. By G. P. Tate, F.R.G.S. Witherby and Co. Price 12s. 6d. net. Pp. xv. + 261. Maps.

During the last few weeks much attention has been attracted by the Russian proposal for a railway across central Persia from Baku on the Caspian, by Teheran and Kirman, to join the Indian system which now ends at Nushki. This book deals with the last stage of this proposed route, the desert between Quetta and Persia, and the country of Seistan. Here meet the frontiers of Persia, Afghanistan, and Baluchistan, and here ends the Helmand in the lake of Seistan. Mr. Tate, of the Indian Surveys, has traversed these regions as a member of the Afghan-Baluch Boundary Commission of 1895-96, and of the Seistan Arbitration Mission for 1903-05. He tells us that he has spent most of the past twenty years in the desert, of which he gives many lifelike pictures.

In his "Gates of India" Sir Thomas Holdich speaks of the three historical highways into India: the northern through Bactria, used by the Assyrians, Persians, and Alexander (Sikander); the middle through central Persia, Seistan, and the Valley of the Helmand; the southern through the Makran valleys to Sind and Karachi. Of these the northern is the oldest; the central and southern were used by the Khalifs in the middle ages. Sir Robert Sandeman first extended British influence on the side of Baluchistan in the early eighties, but it was not until after the demarcation of the boundary between Afghanistan and Baluchistan by Sir Henry McMahon (who writes an introduction to Mr. Tate's book) that the Nushki-Seistan trade route was planned and effective control over the country established. The recent anarchy in Persia has, by blocking the southern trade routes, much increased the traffic through this channel. Mr. Tate describes the route which it traverses through Baluchistan as most inhospitable and, in some respects, hopeless. It is far otherwise with the region of Seistan. There the vast ruins which everywhere exist testify to a past prosperity and civilised population now replaced by a barren wilderness.

To the east of the lower Helmand, shortly before it enters the lake, is a vast series of ruins covering an area of 500 square miles. Here are found coins of Parthian and Sissanian kings and more ancient relics of some rude Scythian dynasty. Possibly light may here be thrown on a yet more ancient civilisation. In the most recent work on the subject—a history of Sumer and Akkad—Mr. King discusses the problem of the earliest civilisation of the Babylonian plain. Unlike that of the Nile Valley, where the traces of neolithic, predynastic, and historic Egyptians are continuous, the relics of the Sumerian forerunners of the early Semites in Babylonia come to an abrupt end somewhere in the fourth millennium, B.C., at which period this people had attained a highly polished culture. Mr. King thinks that the origin of this civilisation may be found perhaps in the prior home of this race before they entered the Euphrates Valley from the east, and that in the ruined sites of Seistan and the Kirman provinces some clue to this may be found.

The small area of Seistan which is now inhabited depends entirely on the waters of the Helmand. The great annual event is the rebuilding of the "band," which diverts its stream into the irrigation channels; this

work occupies 40,000 men for a month. The river has changed its course in the delta more than once in historic times, and the site of the present dam is not that of the famous Weir of Rustam, which was destroyed by Tamerlane in 1384.

The eastern limits of the Seistan lake are quite indefinite and vary with the discharge of the Helmand. This river, rising north-east of Cabul, drains an immense area, but it has been computed to lose nine-tenths of its volume by evaporation before it enters the lake; in 1902 the bed of the river was actually dry for several months. It is exposed during the greater part of the year to fierce heat and to winds of terrific velocity. Indeed the outstanding feature of the climate of this region is the "wind of a hundred and twenty days," which blows from May to September with appalling force. On the summits of the low plateau it cuts rifts hundreds of yards long and 15 to 20 feet deep. It seems to prevail over a strip of country a 100 miles in width and always blows from the north-north-west.

This book is very well got up. The type is excellent and the paper not of the clay variety. There are numerous illustrations and two maps.

J. T. C.

HERNIA: ITS CAUSE AND TREATMENT. By R. W. Murray, F.R.C.S. London: J. and A. Churchill, 1910. Pp. vi. and 182. Price 6s. net.

In this small book the author expresses his conviction that abdominal herniæ are sacular in origin. Cases and authorities are quoted in support of this theory, and a description is given of the operative methods suitable for the treatment of varying conditions.

The first chapter is mainly devoted to a brief historical review of hernia in the early and middle ages. This is followed by a short section on the comparative anatomy and surgery of hernia, and descriptions of various herniæ met with in practice. The writing is marked by a simplicity of style and a freedom from the close reasoning and dull logic so often associated with scientific thought and expression. The author has undoubtedly arrived at very sound conclusions, but his evidence is not produced in a manner to carry conviction to the mind of the reader. When a proposition is incapable of positive proof, the reiteration of a belief, however correct, lends no further weight to the argument. In the text a personal conviction is repeatedly given the pre-eminence which should be accorded to well-considered evidence.

There are many quotations from various writers which are freely acknowledged in these pages, but surely the author might have extended his researches and not have attributed to a recent publication the first mention in this country of a filigree for the treatment of large herniæ. The book is copiously illustrated with excellent diagrams and photographic reproductions, which are not only interesting but instructive. As an effort in special pleading, however, the book is unconvincing.

J. W. H. H.

THE SHIP-SURGEON'S HANDBOOK. By A. Vavasour Elder, M.R.C.S. London: Baillière, Tindall and Cox, 1911. Pp. xii. and 387. Price 5s. net.

The author has written this book mainly in the interests of the young surgeon going to sea on his first voyage. For these it is full of information and useful hints as to what is expected from the ship's doctor both professionally and socially.

It touches, however, on wider subjects, such as hospital accommodation on large passenger ships and the equipment and organisation of the ship's surgery, in a manner which would well repay the attention of the heads of our Mercantile Marine.

There is no doubt that the medical arrangements to be found on the average passenger ship are far below the standard laid down for the Navy or Transport Service, as the private shipowner is less sensitive to public opinion in such matters than a Government service. Yet, if it pays the shipowner to advertise his vessel as carrying a doctor, even in conjunction with a cow and stewardess, it should surely be to his interest to provide the doctor with the equipment necessary for the treatment of sick. There is an interesting chapter on sea-sickness in which the cause and treatment of this malady are thoroughly discussed. Unfortunately, the cure of this condition is not definitely stated. The book is written in a pleasant conversational style which lends emphasis without boredom to the shrewd observations and experiences of its author.

J. W. H. H.

HANDBOOK OF THE WOMEN'S VOLUNTARY AID SOCIETY. "Handbuch des Vaterländischen Frauen-Vereins." Pp. 1,080. 9 in. by 6½ in. Berlin: Carl Heymann, 1910. Price 10s.

This somewhat bulky volume gives an exhaustive survey of all the branches of the "Vaterländischen Frauen-Verein," which embraces the women's voluntary aid societies of the Northern States of the German Empire. The society is affiliated to the Red Cross Society of Germany, but retains its own organisation. The contents of the book are arranged by Provinces and Districts. The details given for each branch include the date of formation, the date on which State recognition was granted, the number of members, the names of the executive committee, a statement of accounts and a note of any special work undertaken by the branch.

A table at the end of the volume gives a detailed summary of the work. From this it is seen that the Society has a total of 450,483 members, its funds are somewhat over £500,000, and it possesses, in addition, buildings and other property valued at roughly £600,000.

C. E. P.

ORGANISATION, ADMINISTRATION, AND EQUIPMENT MADE EASY, WITH APPENDIX OF EXAMINATION PAPERS FULLY ANSWERED. By Lieutenant-Colonel L. T. Banning. Gale and Polden, Ltd. Tenth Edition. Pp. xi. and 216. Price 4s. 6d. net.

A very handy volume, containing a vast amount of useful information in a small space and thoroughly up to date.

That its value has been recognised is obvious from the fact that the work has reached the tenth edition since it was first published in 1899. The references to the official authority for each item that it deals with are most useful, but the fact that there is no detailed index greatly detracts from its usefulness at all times, and relegates it to the position of a "cram" book for examination purposes only.

About one-fourth of the volume is taken up with the publishers' catalogue, which might well be dispensed with, and part of this space devoted to an index, thereby greatly enhancing its value as a book of reference.

G. G. D.

THE NON-SURGICAL TREATMENT OF DUODENAL ULCER. By George Herschell, M.D.London. London: H. J. Glaisher, 1910. Pp. 39. Price 1s. net.

This thoughtful monograph is well worthy of study by those interested in the disease known as ulcer of the duodenum. The author first of all deals thoroughly with the predisposing and exciting causes of this condition. He then describes exhaustively the rationale and means of treatment, and finally lays down a definite scheme of dietary for use during treatment and subsequent convalescence. His writing is clear and concise, and it is only to be regretted that he has not included a few case-sheets of patients who have recovered from this malady without relapse, and without surgical interference. J. W. H. H.

PYE'S ELEMENTARY BANDAGING AND SURGICAL DRESSING. Bristol: J. Wright and Son, Ltd., 1910. Pp. viii. and 235. Price 2s. net.

The twelfth edition of this little handbook contains numerous alterations which bring it into conformity with modern teaching.

The diagrams of bandaging, and the application of splints are clear and effective, but why in the section on Passive Congestion is Bier introduced as of Kiel, when he is the senior surgeon at the Königliche Klinik in Berlin?

A section on the immediate treatment of fractures, and a method of improvising splints, is extremely useful, while conditions of shock, collapse and syncope are also dealt with.

An article on restoration from drowning, and the treatment in cases of poisoning, concludes the book, which should be of much aid to students or nurses when faced with an emergency. J. W. H. H.

Current Literature.

German Expedition against the Kopper Hottentots in March, 1908.—In the *Deutsch. Militär. Zeitschrift* for July 5th, 1910, Surgeon-Lieutenant Ohleman described his experiences while serving with v. Erckert's column against the Kopper Hottentots.

The area of operations was in the Eastern portion of German South-West Africa, adjoining British Bechuanaland. The troops were mounted on camels and had to operate in an almost waterless area. At the concentration camp at Auob, although the natural conditions favoured the appearance of malaria, and this part of the country had always been looked on as very malarious, there was not a single case among the European troops or native followers. Anopheles were present and no quinine parades were held. Typhoid fever appeared during the month of January. The station had not been occupied since 1905, when there was a small garrison. At the same time typhoid fever also appeared among the troops occupying other stations; the natural conclusion was that it must have been introduced by the native drivers of convoys. Measures were therefore taken to prevent these men and the native followers of the column from having any intercourse with the European troops. This precaution proved successful. An attempt was made to have all drinking water boiled. The water contained sulphate of soda; this gave it a very unpleasant taste, which was accentuated by boiling. Consequently great difficulty was experienced in enforcing this regulation

As it was known that water was extremely scarce in the district which the column must cross, experiments were made to determine to what extent the native practice of using the juice of the wild melon in place of water could be relied on. It was found that to obtain 2½ pints of fluid, from twenty to forty melons, according to their size, were necessary. It was obvious that the supply would be insufficient for a column numbering nearly 500 persons (including natives), and that a great deal of time would be wasted in collecting the melons. Scouting parties tried the experiment of using only the fluid obtained from melons. In one case a party managed to subsist on melon juice without any water for sixteen consecutive days. During this period the men lost their appetite and suffered from constipation, partly due to insufficient fluid and partly to the large percentage of tannic acid in the juice. Lime juice and sugar were issued to make the melon juice more palatable.

As the column had to rely mainly on the water it carried with it, the daily ration issued was fixed at 2½ pints. A portion of the water equal to seven days' supply was carried by each man on his camel in camp cooking vessels, the lids of which were previously soldered on ; an opening was left which was closed by a cork : a fourteen days' supply was carried on baggage animals, in old cresol drums holding 50 pints each, three to a camel. To avoid the excessive heat the column marched off at 5.30 p.m., and finished each march during the first part of the night. The water obtained at Ceinab was extremely muddy; it was treated with alum and filtered through charcoal before being put into the drums. The chaplain to the force volunteered to carry out this work.

Towards the end of the expedition the water became putrid, but was drunk by the troops. In some cases its use was followed by an attack of vomiting, but otherwise no ill effects ensued from its use. During twelve days the water ration was restricted to 2½ pints.

After the fight the whole of the troops formed an extended line and searched for wounded among the rocks and bush. The whole of these, nineteen in number, were found. Only a minute quantity of water could be spared for washing hands or wounds. The lying-down patients were transported on litters suspended between two camels; these camels had been to a certain extent trained for this work, but great difficulty was experienced in getting them to rise together. On the march one would suddenly lie down, causing extreme discomfort to the patient. The return journey of, roughly, 150 miles, was accomplished in six days.

C. E. P.

Mental and Nervous Diseases in the Russo-Japanese War.—This important subject is discussed in the *Military Surgeon* of February, 1910, by Captain Richards, Medical Corps, U.S.A. No statistics have as yet been furnished on the incidence of these affections in the Japanese forces; the Russian returns do not appear to be quite complete but the total number of cases of mental disease during the war must have been about 2,000. As the army medical department could not spare the *personnel* required for the care of these cases, a fifty-bed hospital for mental cases was established by the Red Cross Society in Harbin in December, 1904, under Professor Awtakrataw. The average monthly admission rate was 90. Owing to want of accommodation patients had to be transferred to Russia as soon as possible. A total of 1,197 patients were transferred to Moscow, a distance of 5,303 miles, the average duration

of the journey being one month. The surgeons in charge of the train were as far as possible specialists in mental disease. The long journey had a bad effect on the general condition of the patients and aggravated all their symptoms.

At Irkutsk all cases were transferred to a fresh train for the last stage of the journey. Two rest stations were instituted where patients whose condition had become worse during the journey could be admitted. Patients were transferred in batches of about forty at a time, the total escort *personnel* for all duties being forty-eight. Special cars with barred windows were provided and attached to the hospital trains. The untrained soldiers who formed part of the escort were a great source of trouble, especially as they would obey the commands of the insane officer patients. A few insanes were sent home from Port Arthur by sea. The depressed class of patient was specially liable to sea-sickness; those who escaped sea-sickness showed distinct improvement from the voyage.

The article contains several tables of statistics and is of interest, not only for the specialist in mental diseases but also for every army surgeon. C. E. P.

Chinese Flea Trap (*Le Caducée*, February 5th, 1910).—The trap consists of an open framework of cane, shaped somewhat like a miniature soiled-linen basket, with a central removable rod held in position by a pin. The rod is smeared with some sticky substance and placed in position. Fleas alighting on this are held fast. When well covered the stalk is scraped clean and resmeared with the adhesive mixture. The trap is made in two sizes, one for placing in a bed and a smaller one which can be carried in a pocket. C. E. P.

Observations on the Occurrence of Scurvy among the Hottentot and Herrero Prisoners during the German Campaign in South-West Africa.—In the *Deutsch. Militär. Zeitschrift* of August 5th, 1910, Stabsarzt Dr. Bofinger has a long and interesting article describing his experience in the treatment of scurvy among the Herrero and Hottentot prisoners. He ascribes the outbreak of scurvy to (1) the alteration in habits consequent upon the change from freedom to confinement on a small island; (2) want of regular occupation, the incidence of the disease diminished considerably when the male prisoners were given regular work in the station; (3) monotonous diet, especially the absence of fresh milk which usually forms an important article of diet among the natives; (4) the change from the hot, dry climate of the interior to a moist one near the sea; (5) the quality of the water, which in Lüderitzbucht was obtained by distillation from sea-water; the water of the interior is highly charged with mineral salts; (6) the entire lack of knowledge of the most elementary hygiene, especially the aversion to personal cleanliness. Medicinal treatment proved most disappointing. C. E. P.

Pyocyanase in the Treatment of Gonorrhœa (Spatz, *Wiener. Med. Woch.*, No. 40, 1910).—Laboratory experiments conducted by Detre and others showed that pyocyanase, obtained from the fluid in which the bacillus pyocyaneus had been grown, after being heated to 98° C., has a powerful inhibitory effect on cultures of the gonococcus. Spatz, therefore, attempted to make use of this property in the treatment of gonorrhœa. After irrigating the patient with 1 in 1,000 solution of permanganate of

potassium he injected 10 cc. of pyocyanase. In two cases there were symptoms of toxin poisoning. In no case was any benefit derived from the application. C. E. P.

Exercises of Voluntary Aid Detachments (*Sanitätskolonnen vom Rothen Kreuz*), Germany.—*Das Rothe Kreuz* for October, 1910, contains the description of the annual inspection of the Voluntary Aid Detachments belonging to the Höchst a/M centre. The following practical test was set: "A terrific explosion has occurred in a neighbouring factory. The Voluntary Aid Detachments are required to proceed to the spot at once, render first aid to the injured, prepare a large barge as an ambulance ship, and convey the wounded to a temporary hospital to be fitted up by the Voluntary Aid Detachments." Altogether 600 men belonging to the detachments were present.

A dressing station was fitted up in the works. The (supposed) injured were extricated from the ruins by various improvised stretchers and hand-carriage, dressings were applied, and stimulants given. The wounded were then lowered by means of the factory crane into the barge which had meanwhile been fitted up as a temporary hospital ship. The barge was then towed to a fresh landing place, where a transport section was ready to take over the wounded and convey them by means of locally-adapted carriages and wagons to the building selected as a temporary hospital. This building had in the interval been fitted up by the women's detachments as a complete hospital with a ward of twenty-six beds, dressing-room, operating-room, &c. The whole proceedings were most successfully carried out in the presence of delegates from the Central and other committees.

The practice undertaken by the Voluntary Aid Detachments of Southern Westphalia consisted in fitting up a temporary ambulance train and conveying patients (supposed wounded) in this to Siegen, a distance of some 60 miles. A number of different methods for converting railway wagons into ambulance coaches were employed; during the journey each of these methods was demonstrated to the different detachments in turn. Refreshments were served to the patients in the train. C. E. P.

Observations on the Physiology of Acclimatization in the Tropics.—By Dr. Willy Wick, Colonial Surgeon in German New Guinea (*Archiv. für Schiff und Tropen Hygiene*, Bd. xiv., Heft 19, 1910). Dr. Wick's paper deals with observations made on himself, his wife, and daughter, with the object of ascertaining what changes take place in the human economy on transfer from a temperate to a tropical climate. For this purpose he made careful records of his temperature, pulse, and the condition of his blood in Berlin before starting on the voyage out, during the early period of his stay in New Guinea, and later on when acclimatization had taken place.

His principal conclusions are:—(1) When there is a rapid and considerable rise in the temperature of the air, the temperature of the body is also raised; the rise in body temperature is greater if physical work is being performed; (2) when the change from a temperate to a tropical climate takes place gradually, the body temperature is not raised; (3) the rate of respiration falls, and remains lower in a warm climate; (4) during

and after acclimatization the body temperature attains its maximum, equal to a rise of about 1° F. This occurs at 1 p.m., *i.e.*, one hour before the maximum shade temperature of the day; (5) in the Tropics the number of red blood corpuscles, as also the percentage of hæmoglobin, is increased; (6) there was, in spite of hard physical and mental work, an increase in body weight.

Dr. Wick employed Nocht's method of quinine prophylaxis, and was not attacked by fever during his stay in New Guinea, although on one occasion, when his blood was examined, malarial parasites were found; that the quinine did not produce anæmia, or in any way interfere with his health, is evidenced by the results of his observations. Nocht's method is to take 15 grains of quinine every Sunday, divided into doses of 3 grains, one of which is taken every three hours. Each Monday 7½ grains is taken, half of it in the morning and the other half in the evening. Wick thinks that in order to derive the full benefit from this plan of quinine prophylaxis, the details should be strictly adhered to.

C. E. P.

Adaptation of Touring Motor Cars for Ambulance Work (*Bull. Service de Santé*, September, 1910).—Méd. Principal Boisson and M. Mors (an engineer), have designed a framework on the lines of the Breschot-Despretz-Ameline apparatus, which is fitted to the chassis of a touring motor car after removal of the body. This apparatus will take six lying-down patients and can be fitted to a car in three hours at a low cost. Its trials appear to have been satisfactory. C. E. P.

Research Work with "606." (*Deut. Med. Woch.* No. 48, December 1st, 1910).—Dr. Plaut treated a number of cases with this remedy and made careful observations of the results. He used Wechselmann's method of administering the drug. The pain at the time of injection was negligible, but shortly afterwards became very severe, still this disappeared in from twelve to twenty-four hours. When the injection is made into the back, a large firm induration appears at the site within a few days, which does not resolve for four or five weeks. In a few cases the infiltration becomes soft, and a yellowish blood-stained fluid can be expressed through the puncture. No arsenic can be detected by Gossio's method in this exudation. In some cases a necrotic scab, about the size of a five-shilling-piece was formed. In nine cases the infiltration was sufficient to prevent the patient from returning to work. In some cases a relapse set in, and when the first injection had resulted in the formation of a necrotic area, the patient objected to a second injection.

The following is a summary of his results:—

No. of cases treated	Manifestations	Cured	Improved	Failed	Doses
4	Primary lesions	2	1	1	0·3 —0·6 gramme
7	,, and secondary lesions	4	1	2	0·3 —0·6 ,,
14	Secondary cases	6	4	4	0·45—0·6 ,,
12	Tertiary cases	3	8	1	0 5 ,,
4	Hereditary cases	..	4	..	0·04—0·25 ,,
5	Parasyphilis	..	3	2	0·3 ,,
46		15	21	10	

The poorest results were obtained when the injection was made into the back. The original preparation was much more active than the later preparations, which should be injected in larger doses. In many cases brilliant results were obtained, especially in regard to the relief of obstinate headaches.

The Action of the Drug on the Parasite.—Dr. Plaut made a watery solution of "606" and mixed this with an emulsion of living spirochætes, but found that even in a fairly strong concentration the drug had no effect on the movement of the parasites. The following experiment was typical of many: Spirochætes were obtained from mucous patches on the tonsils, and suspended in a hanging drop preparation. The watery solution of "606" was added to it to make a strength of 1 in 20. The first effect noticed was at the end of four hours, when the movements of the spirochætes became somewhat feeble, at the end of another hour some of the spirochætes had ceased to move, and at the end of the seventh hour the movements of the spirochætes were very much reduced, but there was no change in their shape. As a contrast, a strength of 1 in 1,000 of perchloride of mercury stopped all movement of spirochætes in five minutes, and at the end of six hours they could hardly be recognised. It appears then that "606" has an inhibitory effect on the spirochætes in the blood-stream. Spirochætes which do not possess free movement are not in a condition to propagate their species; when the multiplication of the spirochæte stops, we get the stage of apparent cure, which is almost always seen after an injection of "606." This continues until the spirochætes which have been protected from the blood-stream begin to increase and enter the circulation again; the number of these is usually small, which accounts for the mild character of the relapses. We may be perfectly certain that it is not the action of "606" on the spirochætes which causes them to disappear, together with the symptoms of the disease, but that the principal agents in the cure are the protective bodies, which are called forth by the lowered vitality of the spirochætes. The process of cure almost certainly depends upon active immunisation. The milk of a syphilitic mother treated with "606" has a beneficial effect on a syphilitic child, which can only be due to the presence of active immune bodies. The child is not cured, but must be treated with "606." The mother's milk does not contain sufficient arsenic to be detected by the biological test.

The serum of syphilitic patients who have been treated with "606" has a similar effect to that of a syphilitic mother's milk after treatment with "606." The writer used "606" syphilitic serum for the treatment of certain cases, *e.g.*, paralysis, and weakly syphilitic children; the results were encouraging and there were no bad effects, although none of the cases were cured. The serum was at first injected in small doses, 3 to 15 cc., but on Professor Ehrlich's advice, the doses were increased to 20 cc. As a control, serum from healthy patients was tried, as also that from a person who had been treated with mercury; the latter had a similar but feebler effect than the "606" serum. Healthy serum had no influence whatever. C. E. P.

The Evolution of the Arsenical Treatment of Syphilis. Professor K. Zieler (*Münch. Med. Wochensch.*, November 22nd, 1910).—Zieler first points out that scientific investigation of the treatment of syphilis

could not take place until the active agent of the disease had been discovered by Schaudinn, and that great assistance has also been rendered by the discovery of Wassermann's reaction.

It was known that preparations of arsenic exerted a powerful effect on trypanosomes, and as the result of experimental research on trypanosomes atoxyl was produced.

When Schaudinn pointed out the close resemblance between trypanosomes and spirochætes, atoxyl was tried in the treatment of syphilis. A certain amount of success was obtained but also many disappointments, especially in regard to relapses.

A combination of atoxyl and mercury was then introduced, but although the effect was rapid it was not lasting.

Ehrlich meanwhile was working out the subject on his own lines. First of all in conjunction with Bertheim, he ascertained the exact chemical composition of atoxyl. He then investigated the action of atoxyl on trypanosomes, and found that this was not due to a chemical reaction between the trypanosomes and the atoxyl, but that it depended on slight changes in the composition of the drug. Atoxyl-resisting trypanosomes could be destroyed by a number of combinations of atoxyl with acetic acid, *e.g.*, arsacetin. Ehrlich was therefore led to believe that the protoplasm of the trypanosomes contains a number of chemical receptors, *e.g.*, an arsenic receptor, and an acetic receptor, so that the acetic receptor first becomes anchored to the protoplasm and that the arsenic which is combined with the acetic molecule is then enabled to destroy the trypanosome. The task thus became clear, viz., to find chemical combinations which have a high affinity for the protoplasm of the parasite, but not for that of its host. Among other discoveries it was found that spirilla possess an iodine receptor, and that consequently iodine in combination with arsenic is quickly taken up by them, and that the arsenic, for which alone they have little affinity, is then able to destroy the parasite. Spirilla also possess an amido receptor, which discovery led to the preparation of dioxydiamido-arsenobenzol. Ehrlich also showed that quinquivalent preparations of arsenic (atoxyl) behave in the human body quite differently to the trivalent ones. Ehrlich believes that he has also found facts confirming his views as to the organism's need for oxygen, and that it is not the arsenical preparation which brings about the cure, but its products of disintegration, which act as powerful reducing agents.

C. E. P.

Treatment of Syphilis by Arsenobenzol ("**606**") (Scholtz, Salzberger, and Beck, *Deutsch. Med. Woch.*, No. 50 of 1910, p. 2330).—In a paper on this subject the writers recommend the intravenous injection of "606." In eighty cases which had been treated with "606" three months previously, they found fifteen relapses in which the signs of the disease were evident on clinical examination; in twelve other cases Wassermann's reaction was positive. In twenty-four out of eighty cases therefore, a single injection of "606" had failed to effect a cure, and it is possible that others out of the eighty may in the future show relapses.

In these eighty cases a negative Wassermann was only found in twenty-one cases, and in the majority of these the reaction only became negative in the sixth week after the injection.

In two cases the relapse took the form of mucous patches containing spirochætes, although the serum reaction was negative at the time when

the relapses were present. In the above cases the dose varied between 0·3 and 0·6 gramme; twenty-three were injected according to Michael's and Wechselmann's technique and one by Alt's method.

When the drug is injected in neutral suspension, as recommended by Wechselmann, absorption takes place very slowly. To investigate the action of "606" on the tissues, experiments were made on rabbits, the site of injection being excised after varying periods and microscopically examined. When Wechselmann's method was used the injection produced a circumscribed necrosis which speedily became shut off by a firm capsule. Up to five or six days after the injection a large proportion of the yellow salt could still be found lying between the necrosed muscle fibres and firmly encapsuled. Alt's plan was considered to be too painful for use in general practice. Blaschko's plan does not seem to offer any advantages in regard to the rate of absorption.

The authors prepare "606" for injection in the following way: The powder is first moistened with glycerine and rubbed into a paste, to which is added a few cubic centimetres of hot sterile water; under continual stirring normal soda solution is added drop by drop till a gelatinous emulsion is formed; on adding a little more soda solution the emulsion becomes fluid with the powder suspended in very fine particles. The actual quantity of soda solution required for 0·1 gramme of "606" is 0·45 cc.; the bulk of the injection is then made up to 10 cc. with normal saline solution. The therapeutic effect is stated to be excellent, while the pain and induration is much less than by the other methods.

Kromayer's suspension in oil or paraffin is condemned on account of the slow absorption and the fact that the salt must take up alkali from the tissues before being absorbed. If an oily suspension is desired it is better to add 0 6 cc. of a 13 per cent. soda solution to each 0·5 gramme of "606," rub these together to form a paste, then place the paste in a hot cupboard for ten to fifteen minutes to dry, after which it is made into a 10 per cent. emulsion by rubbing it up with oil.

The writers have also tried the plan of giving several injections of a mercurial salt, preferably calomel, in from seven to fourteen days, and then employing the "606" by combined intravenous and subcutaneous injection. The idea underlying this plan of treatment is that the mercury shall first bring about absorption of the syphilitic cell infiltration, in which the spirochætes are lying shut off from the circulation, and thus expose them to the action of the "606." C. E. P.

Notes on the Administration of Salvarsan ("**606**").—By Marine-stabarzt Gennersich. The writer states that a complete cure of syphilis by a single injection can only be hoped for in very early stages of the disease. In the ordinary case in which the virus of syphilis has become generalised throughout the tissues, we must give a second injection about three weeks after the first. This plan of treatment is based on numerous observations controlled by Wassermann's reaction.

For intravenous injection 0·5 gramme is the usual dose employed. When this is dissolved in 150 cc. of fluid there is always considerable general reaction; pyrexia, nausea, lowered blood-pressure, &c. Should the injection be more concentrated, the reaction is more intense, and the patient's condition may even become very serious. When only 150 cc. of fluid are used, the injected vein not uncommonly becomes thrombosed.

When the bulk of the injection is increased to 250 cc. the general

reaction is of an extremely mild and temporary character. When freely diluted, a dose of 0·6 to 0·7 gramme may be injected intravenously without risk.

As a routine method, the writer prefers subcutaneous injection, as the intramuscular injection leads to much necrosis and interference with the use of the part. After subcutaneous injection, the resultant swelling and infiltration, being near the surface, can be brought under the influence of local applications.

Emulsions in oil have been found to be quite as painful as watery solutions. As regards the repeated small doses of about 0·1 gramme every four or five days, the writer's experience has been that no special benefit is derived from this plan. In most cases the writer employs mercurial treatment along with "606." He gives from three to five injections, each containing 0·05 gramme of calomel during the three weeks of treatment by "606." C. E. P.

Correspondence.

YELLOW FEVER, BILIOUS REMITTENT, AND REMITTENT FEVERS IN WEST AFRICA.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—I have read with interest Sir Rubert Boyce's article in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS. I have also followed, as they were published, his letters in the *British Medical Journal*. His conclusion that yellow fever is endemic in various places on the West Coast of Africa is, no doubt, true. Surely, however, this has long been recognised. I know that when I went out to Sierra Leone in February, 1909, yellow fever had been impressed on my mind, from medical literature referring to the West Coast, as one of the diseases which Europeans were liable to contract there. I have beside me now notes of a lecture prepared for delivery to the troops on board the ship in which I went out; in this lecture reference was made to yellow fever as a disease occurring on the West Coast, and attention was called to the means by which it is spread, and to the methods of prevention. But exception must be taken to the further inference by Sir Rubert Boyce, for which he shows no valid proof, viz., that "a vast number of remittent and bilious remittent fevers are only mild and common types of yellow fever." The whole of his articles convey the impression that a very large proportion of the diseases diagnosed remittent or bilious remittent fever is really yellow fever. I do not think this is the case.

The great majority of Europeans in Sierra Leone are British soldiers. Of recent years the diagnosis of malarial fever in European soldiers has been confirmed by the microscope. From February, 1909, to March, 1910, with the exception of a few weeks when I was up country, I can vouch that in all cases of malaria in European soldiers the diagnosis was confirmed by the microscope. Now, these were cases infected with malignant tertian parasites, most of them were typically *remittent* fevers, and several

what many observers would call bilious remittent fever. All the cases recovered under quinine, mostly given by intra-muscular injection.

These cases, of whom there were many, give a good example of what in a European civilian would be classified as remittent fever.

No doubt the European soldier is well housed, and lives under better sanitary conditions than many civilian business men and traders. But many soldiers certainly contract their fever in the native town or suburbs of Freetown, not in the main barracks. If they thus contract malaria, they are also about as liable as the civilian to get yellow fever. There is no doubt that there are far more stegomyia than *Pyrotophorus costalis* (the common Freetown anopheline) about Sierra Leone.

As regards the fevers of the native inhabitants, both Creoles and the indigenous tribes, it is as difficult as it is in India to say what all these fevers may be, seeing that such a small proportion come under the observation of medical men. A very large number are treated by native fetish men. Certainly a vast number of the natives, especially infants, are infected with malaria. In three up-country stations I found from 85 to 95 per cent. of the children under 3 years of age had parasites in their blood. While in one of the suburbs of Freetown out of thirty children, up to the age of 7, 30 per cent. had malarial parasites in their blood. The infantile mortality is very high. Yellow fever also may quite well be lurking endemically among the infant population in the more crowded and insanitary parts of the native towns, where Europeans are not likely to be bitten by stegomyia at night. (Stegomyia biting by day are said never to be infective, as after their first feed of blood they soon ovulate, and always afterwards bite at night only. After biting an infected person, they do not become capable of infecting healthy people for ten days, before which time they would have ovulated and become nocturnal feeders).

Native adults are probably immune to yellow fever, having had their attack in infancy, and so are incapable of acting as foci of infection for stegomyia (only during the first three days of the fever is man infective). Thus the chance of a European contracting the disease is likely to be small; *Stegomyia calopus*, being a domesticated gnat, is not likely to travel far from the particular locality in which it was bred. Now and again, by some chance, a European may get infected at one of the endemic foci; then he becomes a focus of a small epidemic amongst his non-immunised compatriots with whom he may be living, or who frequent his house. I do not doubt that in some such manner as this yellow fever may be endemic in West Africa just as typhus fever used to be in the slums of some of our large cities. But I think it would be as true to say that vast numbers of the cases diagnosed influenza, measles, or some other fever are really mild cases of typhus, as to say that vast numbers of cases of remittent fever diagnosed by competent medical men are really yellow fever. No doubt a few errors may have occurred, especially in days before the microscope was in fairly general use.

Occasionally at the beginning of a small epidemic outbreak, a mistake may be made in diagnosis. Such a case in point was the fatal case in a civilian in 1909, which Sir R. Boyce quotes in the *British Medical Journal* of January 28th, 1911.

I did not personally see this case, but in a blood-film (taken after quinine had been administered) I found no malarial parasites, nor was the differential leucocyte count indicative of malaria. The patient referred to had just returned from a visit to an outlying town, where he may have occupied a house in which infective stegomyia were present; his duties probably brought him in contact with many of the poor Creole families. From information I have received from Dr. Barrows, who worked through the epidemic in the spring of 1910, I know there is some doubt about the diagnosis of this case. A blood-film was sent to England for examination, and, as I had found, the result was negative as regards malarial parasites.

Sir R. Boyce seems to think that a high mortality amongst European cases diagnosed as "remittent," "endemial remittent," "malignant remittent," "African fever," &c., in the early periods of last century is proof that they were all cases of yellow fever.

According to the manuscript records at the Military Hospital, Freetown (some of which are very interesting, and would be much better preserved in the library at Millbank than in Freetown), no doubt some of the worst outbreaks of disease were due to yellow fever. But I have no doubt that a large proportion of the mortality was due to malignant tertian malaria untreated by quinine. If quinine were withheld nowadays many of the malarial cases would die.

Two deaths occurred in the garrison in the early part of 1910, one a soldier of the West Indian Regiment, diagnosed, if I remember right, malignant malaria. His cerebral capillaries were absolutely crammed with malarial parasites. The other, a European soldier, died of black-water fever. No malarial parasites were found in his blood, which was very watery—in fact, more like serum than blood. His urine was the colour of porter, and contained methæmoglobin (by spectroscope) and many pigment casts and albumin. He was jaundiced, and had much bilious vomiting and fever. He died, I think, on the fourth day of his illness.

I think the difficulty of diagnosis between such a fulminating case of black-water fever and yellow fever is very great, indeed. It is very possible that certain cases of the one disease may be mistaken for the other, and *vice versa*.

Sir Rubert Boyce has done service in emphasising the endemic existence of yellow fever in West Africa, but he has gone too far in postulating the probability of wholesale error in diagnosis.

I am, &c.,

J. M. CUTHBERT,
Captain R.A.M.C.

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Original Communications.

FURTHER OBSERVATIONS ON THE USE OF SALVARSAN IN SYPHILIS.

BY MAJOR T. W. GIBBARD, CAPTAIN L. W. HARRISON, AND LIEUTENANT A. S. CANE.
Royal Army Medical Corps.

IN November, 1910, two of us published a preliminary note in this Journal on the treatment of syphilis with "606." Our observations were naturally very incomplete, as nothing could be said regarding the permanence of the results we had observed after administering the remedy.

We have since had an opportunity of using Salvarsan, as "606" is now called, in 116 other cases of syphilis, and our technique has undergone considerable modifications, so that, though it is as yet too early to form any definite opinion as to the position which this remedy will eventually occupy in the therapeutics of syphilis, a further report on our observations seems necessary.

In regard to the method of administration, after injecting forty-three cases subcutaneously or intramuscularly with the emulsion prepared as described in our last communication, or according to the somewhat similar technique advocated by Wechselmann and Lange, we adopted the intravenous method on Professor Ehrlich's advice, as he had found that, amongst other advantages, beneficial effects were more lasting after this method of treatment than after subcutaneous or intramuscular injection.

We were very glad to do so because the subcutaneous injection

was followed in a certain number of our cases by sloughing of the skin at the site of the injection. Some of the sloughs formed ten to twelve days after the injection, while five others did not occur till three to four and a-half months later. Major W. W. O. Beveridge, D.S.O., and Captain N. D. Walker very kindly examined the necrosed tissue in a number of these cases, and found that it contained surprisingly large amounts of arsenic, even as late as four and a-half months after the injection (see paper by these officers), so that, apart from the inconvenience to the patient, absorption of the remedy from the site of injection must have been very slow. Judging by our observations, and those of others who have reported on this occurrence, necrosis results from the direct chemical action of Salvarsan on the tissues, not from the mechanical effect of injecting a large volume of material into them, and it seems probable that, even in cases where no slough occurs, there is always more or less tissue destruction at the site of the injection.

In a number of other cases the friction of accoutrements caused troublesome infiltrations to form at the injection sites weeks after, though the patients had been kept in hospital till all signs of local trouble had apparently gone, and in all cases for at least two weeks after the injection.

The advantages of the intravenous method of administering Salvarsan are, that local trouble is very exceptional, and, in the very great majority of cases, all general after-effects have passed away by the following day. In addition to these, absorption of the remedy is insured by placing it directly in the circulation, so that, as far as can be judged at present, every treponema which can be reached by the circulating blood is attacked at once with a much more powerful dose than when the remedy has to be absorbed in small and irregular amounts from a local depot. A disadvantage of the intravenous method is that the remedy, being comparatively rapidly excreted (see additional note), does not seem to remain sufficiently long in the circulation after a single injection to insure destruction of all the treponemata. As will be shown later, we hope to overcome this disadvantage.

In administering Salvarsan intravenously, it is highly important to give it in a very dilute form, since a concentrated solution administered in this way would be very toxic.

Technique.—In a glass cylinder, graduated in cubic centimetres, are placed 100 cc. of hot, sterile, distilled water, and into it are shaken the contents of a capsule of the remedy (0·6 gramme), while stirring with a glass rod. The powder dissolves easily, and a clear

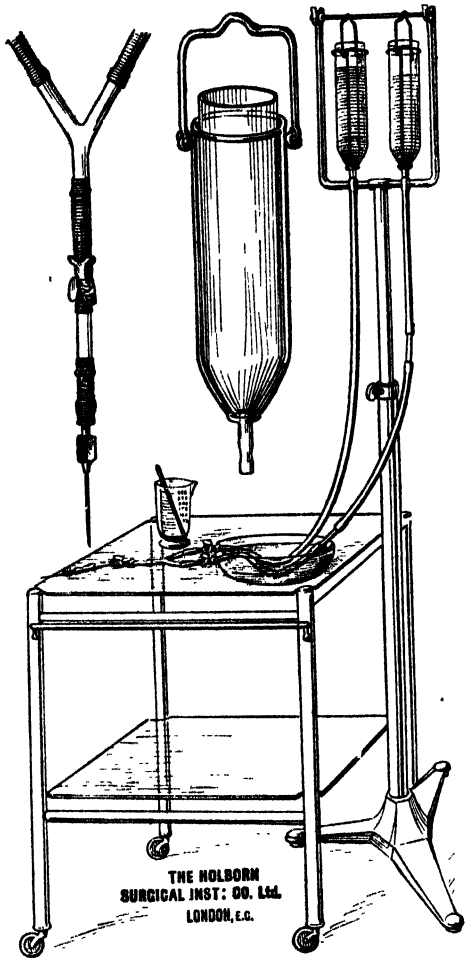
yellow, highly acid solution results. To this, normal NaOH solution is slowly added from a pipette, while stirring, till the flocculent precipitate which forms at first is dissolved (as a rule about 4·2 cc. of the alkali is required). When the solution is quite clear it is made up to 200 cc. with warm, sterile, physiological salt solution (0·85 per cent.). If it be desired to give less than 0·6 gramme it is convenient to make the solution up to 240 cc., so that each 40 cc. of it corresponds to 0·1 gramme of the remedy, and the dose can be accurately measured. When ready, the vessels containing the Salvarsan and physiological salt solutions are placed in hot water to keep them warm while the transfusion apparatus is being arranged.

For injecting the remedy intravenously we used at first the syringe devised by Dr. Schreiber, which is made by Cassel, of Frankfurt, but found that it required so much care to prevent the needle moving and coming out of the vein, or perforating it again, that we abandoned it for the simpler transfusion method.

The apparatus shown in the illustration is merely an elaboration of the funnel, rubber tubing, and needle, frequently used for transfusion purposes. Two containers, one for salt solution (on the left), the other for Salvarsan, are suspended from a stand which can be raised; from the bottom of each container a piece of rubber tubing about 4 feet long is led to one arm of a glass Y-piece, that on the right (for Salvarsan solution) being interrupted by two short pieces of glass tubing inserted about a foot apart to act as windows. To the stem of the Y-piece is attached a rubber tube about 6 inches long, also provided with a short glass window, and to the other end of this short tube is attached a connection to take the needle. The latter is of the pattern recommended by Dr. Weintraud; it is about as thick as an ordinary hypodermic needle, but differs from it in having a shorter point, so that there may be as little risk as possible of wounding the other side of the vein. In choosing a needle for this purpose, however, it is advisable not to have an excessively short point, because the shorter the point the more difficult it is to penetrate the vein, which is apt to slip to one side. Each of the three rubber tubes mentioned is provided with a spring clip to occlude it when necessary.

The apparatus is arranged as follows: The two containers having been suspended from the stand, the clips on the two long tubes leading from them to the Y-piece are opened, while the tube between the needle and Y-piece is closed with its clip. Warm, physiological salt solution is poured into one of the containers and finds its own level, *via* the Y-piece, in the other. Air-bubbles are

then removed from the tubes by shaking or otherwise manipulating them, and with the salt solution standing about an inch from the bottom of each container, the long tube which is provided with the



APPARATUS USED AT THE MILITARY HOSPITAL, ROCHESTER ROW, FOR INTRAVENOUS INJECTION OF SALVARSAN.

two windows is closed with its clip, the other remaining open. The dose of Salvarsan solution is then poured into the container which has the tube with the glass windows, and the other is filled with warm physiological salt solution. The needle is now attached, and

the clip on the tube between it and the Y-piece opened to allow salt solution to wash air bubbles out of this portion. All air having been removed the flow of salt solution is stopped by clipping the long tube which conducts it to the Y-piece, all slack tubing is coiled into a vessel containing water at about 110° F., the containers are lowered to a level slightly above that of the patient, and the apparatus is ready. The object of coiling the rubber tubing in hot water is to warm the solutions passing through it, as these are exposed to a large cooling surface while slowly descending their respective tubes.

The patient lies on a bed or operating table, with one arm comfortably supported in a position which is convenient to the operator. A prominent vein at the bend of the elbow is selected and the skin over it disinfected by painting with a solution of iodine in chloroform (1 in 15). A rubber band is then applied sufficiently tightly to the upper arm to retard the venous return without entirely abolishing the radial pulse, and the patient made to clench and unclench his fist a few times, the muscular contractions serving to distend the vein wall. With the needle pointing in the direction of the blood flow, almost parallel with the skin surface, and its eye uppermost, its point is applied well over the centre of the vessel and pushed steadily on into the lumen. It is better to do this steadily and deliberately rather than with a sudden movement, because the vein is then less likely to slip to one side, or the needle to perforate the other side of it. One can tell by touch in most cases that the needle has entered the vein successfully, but a more certain indication is afforded by the appearance of blood at the window near the needle. The containers are then at once raised, the clip on the tube conducting the salt solution (on the left in the illustration) is opened and the rubber band on the upper arm removed; salt solution will then commence to flow into the vein. Further proof that the needle is properly in the vein is given here by the steadily diminishing level of the salt solution, with the absence of any swelling over the vessel, such as would happen if the needle point were in the subcutaneous tissues. The salt solution is run in first in this way, so that if the needle is not properly inside the vessel no inflammation will result, such as would occur with "606" solution. When about 10 cc. of salt solution has been allowed to flow in this way the corresponding long tube is closed, and the flow of Salvarsan solution started by opening the clip on the tube provided with the two windows. As the solution approaches the bottom of the

container about 20 cc. of salt solution are poured in on top of it in order to help the last few cubic centimetres of Salvarsan along the tube. When the solution passes the upper of the two glass windows the containers are raised to increase the pressure, and the upper level of the fluid will presently be seen to pass the lower window on this tube, which is then closed, that conducting the salt solution again opened and about 15 cc. of the salt solution allowed to flow through the needle to wash it and the adjacent vein wall free from all traces of the remedy. The flow is then stopped, the needle removed, and a dressing applied.

The rate of flow is easily regulated by the height of the containers above the patient. As a rule about 30 cc. per minute can be run in, though very occasionally the patient cannot take this quantity and complains of oppression: in such cases a longer time must be taken over the injection.

The advantage of having two containers is that the needle can be washed entirely free of Salvarsan solution at the end of the operation, and when a number of patients have to be injected in succession, it is only necessary on the completion of each administration to close the short tube between the needle and Y-piece and to open both clips on the two long tubes, when the salt solution will flow from its own into the Salvarsan container and all is ready again.

It is very easy to keep the needle in the vein during the injection; in fact, if the short tube between the Y-piece and the needle be lightly fastened to the arm with a piece of strapping (or even without this precaution) one can go on preparing the dose for the next patient during this time. In actual practice the whole operation is extremely simple, and it is quite usual with us to administer in this way five full doses in an hour.

Regarding dosage, we have usually given 0·5 to 0·6 gramme to men in good health otherwise, and 0·2 to 0·4 gramme to cerebral and spinal cases, and to those who were very debilitated. In twenty-four cases we gave only a single injection, in forty-seven we administered two of the above doses at an interval of two to three weeks, and we have lately commenced a series of cases in which a full initial dose is given, followed by three fortnightly injections of 0·2 gramme each. A comparison of the results, especially as regards their permanence, obtained after each scheme of treatment, will, we hope, eventually throw some light on the best method to follow. In framing this programme we have been influenced by the following considerations: (1) The very rapid clinical effects which follow

an injection of even 0·4 gramme Salvarsan subcutaneously, and the disappearance of treponemata from local lesions, combined with the evidence pointing to very slow absorption of the remedy from a local depot, indicate that a very small amount of the drug in the circulation suffices to destroy or suppress multitudes of the parasites.

(2) An intravenous injection of 0·5 gramme of Salvarsan, insuring as it does the sudden assailing of the parasites, with a considerably larger dose than can be absorbed at one time from a local depot, should, theoretically, be still more effective in destroying the parasites at once.

(3) On the other hand, relapses occasionally occur after intravenous injection of this dose, so that in these cases either (*a*) some of the treponemata are originally resistant to Salvarsan, or (*b*) a developmental stage exists in which the parasites are always resistant (analogous to spore formation in some bacteria), or (*c*) some of the parasites are never touched by the remedy during the time it remains in the circulation, because they lie protected inside thrombi, or granulomatous masses, or in parenchymatous cells; or (*d*), depending on (*c*), some of these parasites becoming exposed to the circulating blood, and therefore to the remedy in it, towards the end of the period of excretion of the drug, survive the feeble dose remaining in the circulation and so acquire an immunity to "606."

Admitting these theories, in case (*a*) further administration of the remedy would be useless; in (*b*) or (*c*) permanent cure would depend on insuring the presence of the remedy in the circulation for a given length of time, while in case (*d*) it would be necessary that during this time the drug should be in sufficient amount to destroy the parasites as they became exposed to it.

In three of our cases which relapsed, a second injection of Salvarsan produced as prompt a disappearance of symptoms as after the first injection, and this would support either (*b*) or (*c*) of the above theories. On the other hand, an ulcerated throat was only slightly affected, if at all, by a second and third injection, and this would support (*a*) or (*d*) of these theories. In this case, it should be mentioned, however, that *T. pallidum* could not be demonstrated in the relapsing lesion, though portions of the ulcerated tonsil were emulsified and injected into the testicles of two rabbits, while others were prepared by Levaditi's method, and sections carefully examined. In this case too the Wassermann reaction, originally positive, became negative and remained so at the time of relapse.

It is unfortunate that the lower animals are so resistant to

T. pallidum that they are not suitable for experiments to decide these important questions, and meantime our only course seems to be to compare the results observed after administering the remedy to a series of cases of syphilis on definitely varying plans similar to those we have mentioned.

Iversen, as well as Schreiber, recognising the necessity of keeping the remedy in the circulation for a longer period of time than is obtained by a single intravenous injection, advises that an intramuscular injection be given twenty-four to forty-eight hours after the intravenous. For reasons we have mentioned, we desire to avoid the intramuscular method if possible, and think that if we can ultimately insure the complete destruction of the treponemata by repeated intravenous injections, on a principle of intermittent sterilisation, it will be better from the point of view of military service.

In our cases the immediate effects of injecting a full dose of Salvarsan intravenously were as follows : In a very few cases some nausea and vomiting occurred immediately after. In two of these patients, who were very debilitated, the nausea was accompanied by marked faintness, with almost imperceptible pulse and pronounced pallor; these symptoms passed off rapidly after the patients had vomited. In the great majority no after-effects were felt for two to three hours, when in about 50 per cent of our cases a feeling of chilliness occurred, which sometimes went on to a severe rigor lasting an hour or so. The temperature in these cases was 100° F. to 104° F., with an average of 102·4° F. on the evening of injection. In some cases nausea came on two to three hours after the injection, and a few of these vomited, while in five cases persistent vomiting and diarrhœa lasted well into the following day. Previous preparation of the patient seems to be useful in preventing some of these after-effects, particularly those depending on irritation of the stomach, and we advise a saline purge in the morning, restricted fluids, and no solid food for two to three hours before the injection. A very light diet is advisable for twenty-four hours after.

On the day after the injection the temperature was above normal on five out of 201 occasions on which we have given Salvarsan intravenously, and three times on the evening of the third day.

It will be seen therefore that in the great majority of cases all after-effects had disappeared by the following day.

The urine was examined on the day after, and in a number of cases on the two following days, and albumin found twice; in one of these the patient had an urethral chancre, while in both the amount was slight and disappeared in a few days.

Regarding local effects, in one case thrombosis occurred in the vein, but caused no inconvenience and subsided in a fortnight; it was probably due to the needle not having been washed free of Salvarsan solution at the end of the injection. In another case some swelling of the arm followed the injection, and was attributed to the needle having accidentally penetrated the tissues on the deep side of the vein towards the end of the administration, and caused an infiltration there; the swelling was slight, caused no inconvenience, and disappeared ten days later. These are all the local effects we have seen in our cases since we adopted the intravenous method.

The therapeutic effect of Salvarsan in syphilis is illustrated by the following extracts from our notes. For purposes of comparison, we have noted in every case the time which has elapsed between the injection and the disappearance of each separate lesion, and obtained the following results: In forty-two cases with primary sore, this had completely healed in an average of 11·4 days. In fifteen of these no other lesion was present, and no secondary symptoms have yet appeared, though in thirteen a period varying from six weeks to six months has elapsed. In fifty-three cases with mucous patches or early secondary ulceration of the mouth or throat, these lesions had completely disappeared in an average of nine days; in twenty-five cases of maculo-roseolar rash, this disappeared in an average of 7·3 days; fifteen cases of papular and pustular rash were clear in an average of nine days; and in eight cases with condylomata, these had disappeared in an average of 7·3 days each.

Out of the 116 cases suffering from the above lesions, in seven the original manifestations have recurred. The particulars of these are as follows: Three were primary sores with no other lesions; of these, one recurred at Aldershot two months after a subcutaneous injection of 0·6 gramme; one, two months after an intravenous injection of 0·5 gramme; and one, ten weeks after the first of two intravenous injections of 0·5 gramme and 0·4 gramme respectively. In the second of these primary cases no treponemata were found in three specimens examined under dark-ground illumination, but the sore appeared typical, and the Wassermann reaction, originally negative, had become positive. In the third case treponemata were found in large numbers in the recurring sore; the Wassermann reaction remained negative. Another injection of 0·5 gramme intravenously caused this sore to disappear in six days; neither of the first two received a second injection after relapsing.

On account of these relapses, we now make a practice of applying vigorous local treatment—excision, cautery, or 30 per cent. calomel ointment—to all primary lesions, since treponemata in them may be protected from attack *viâ* the circulation by lying in thrombosed vessels. In the practice of other workers also relapses of primary sores after "606" appear to be much more common than those of later lesions.

Of the four remaining relapses, one originally had an ulcerated throat, and this recurred three months after a subcutaneous injection of 0·6 gramme; this case has already been mentioned in discussing the principles underlying the administration of Salvarsan, and, as stated, no marked effect was produced by a second injection; the Wassermann reaction remained negative. One case originally suffered from ulceration of the tongue, which recurred two months after a subcutaneous injection of 0·6 gramme; the Wassermann reaction originally strongly positive, became negative to the original test, but remained positive to Stern's modification; another injection has not yet been given. The third case of this class originally had ulceration of the throat, synovitis of the left elbow, and rash, all of which recurred three months after an intravenous injection of 0·5 gramme; the Wassermann reaction, after becoming completely negative, was found to be positive one week before the relapse occurred; another intravenous injection of 0·5 gramme was followed by complete disappearance of all signs in eight days. The last case originally suffered from ulceration of throat and rash, both of which recurred four months after a subcutaneous injection of 0·6 gramme into two sites, one of which sloughed; the Wassermann reaction, having become completely negative, again became positive three weeks before the relapse occurred; an intravenous injection of 0·5 gramme caused these symptoms to disappear completely in four days.

With the exception of one which will be mentioned later, these are all the relapses we have observed in the 152 cases of syphilis we have treated with Salvarsan, of which thirty-three have been under observation for five months or more, twenty-nine for three to five months, and twenty-seven for two to three months.

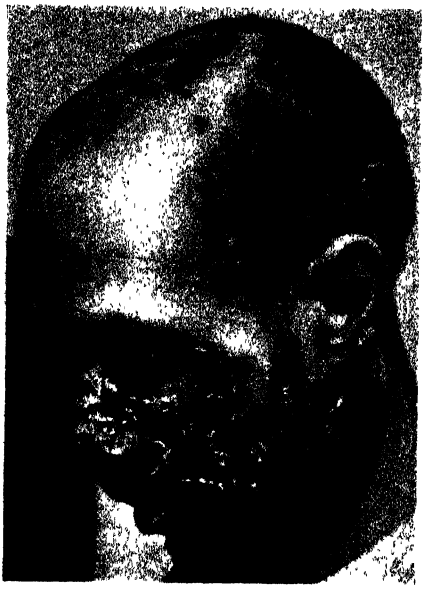
One case of advanced general paralysis with delusions was unaffected by an intravenous injection of 0·2 gramme, followed, a week later, by a subcutaneous injection of the same dose; another case of the same disease, though not so advanced, showed considerable improvement after two intravenous injections of 0·2 gramme and 0·4 gramme respectively, but this may easily be a coincident

remission. In a case of advanced tabes with optic atrophy and paraplegia the eye symptoms were unaffected, but some improvement in the paraplegia followed an intravenous injection of 0·2 gramme; a case of tabes with well-marked signs showed some slight improvement at first after two intravenous injections of 0·4 gramme, but all the symptoms returned eventually. In a case with Argyll-Robertson pupil and lightning pains, the pupil was unaffected and the lightning pains not entirely abolished by two intravenous injections of 0·3 gramme and 0·4 gramme respectively. These are the only cases of parasyphilis which we have treated.

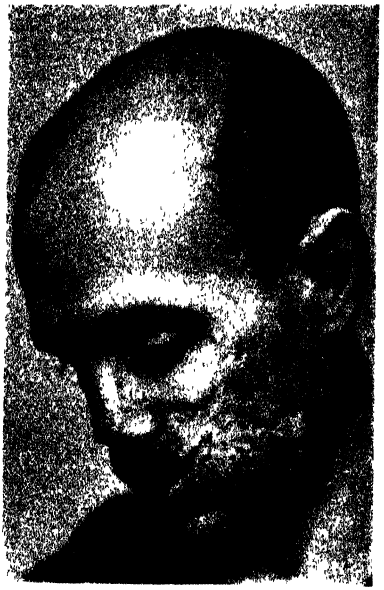
We have had an opportunity of administering Salvarsan to ten cases in which regular mercurial treatment from the first failed to arrest the progress of troublesome or dangerous symptoms; to twenty-two in which the same regular treatment had failed to prevent frequent recrudescences of the disease; to one in which regular treatment, commenced after the onset of severe mutilating ulceration, entirely failed to arrest the lesions; and to one in which mercurial treatment could not be tolerated. These cases have been drawn from a number of military hospitals in the United Kingdom. In all of them, with one exception, the injection of Salvarsan was followed by complete disappearance of all symptoms. The single exception was a patient with ulceration of the larynx and hard palate with necrosis of bone; the ulcers healed completely, but the voice is still somewhat hoarse, though improving daily.

The following brief notes on some of the cases will possibly be interesting :—

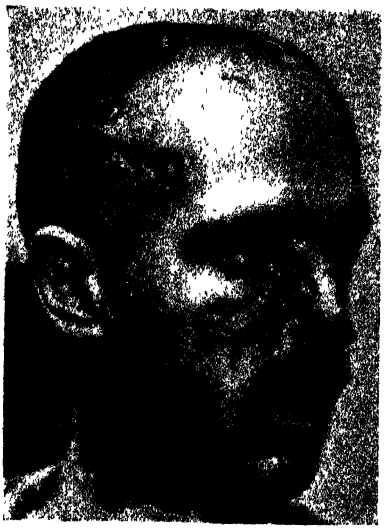
Pensioner B. Contracted syphilis early in 1900, in India; he was treated with mercury by the mouth till secondary symptoms had disappeared. No further symptoms occurred till April, 1910, when he was admitted for ulceration of the head, face, neck, and other parts of his body, the number of ulcers being forty. Under mercurial treatment by the mouth, with potassium iodide, some of the ulcers on the face had commenced to heal by November, 1910, but at this time a fresh crop had broken out elsewhere, and he was rapidly going downhill. On transfer to Rochester Row, November 24th, 1910, his condition was as follows (see photographs): Face covered with large ulcers, complete destruction of a portion of the right side of the nose, with very offensive nasal discharge, large ulcers of scalp and both sides of neck, perforating ulcer of sole of left foot, and a very large, deep, and offensive ulcer, 3½ inches across, on inner side of left ankle. There were also smaller ulcers on other parts of the body. The patient was very thin and so deaf that he could only hear when shouted at. Intravenous injection of 0·5 gramme Salvarsan.



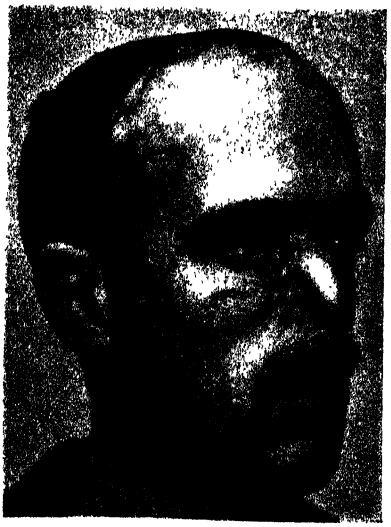
On day Salvarsan was injected.



Ten days after injection.



On day Salvarsan was injected.



Ten days after injection.

PENSIONER B.

Ten days later, ulcers on face, neck, and nose completely healed (see photographs), and hearing normal. Three weeks later, all ulcers, save that on ankle, completely healed.

December 20th, 1910.—Second injection of Salvarsan, 0·4 gramme intravenously.

December 31st, 1910.—Ulcer on ankle healed up, except for a small area, $\frac{1}{8}$ inch by $\frac{3}{8}$ inch; gain in weight, 31 lb.

February 11th, 1911.—Discharged hospital with all ulcers completely healed, and feeling quite well.

Wassermann reaction, strongly positive on transfer, was completely negative three weeks after the injection, and remained so till the date of his discharge.

Private M. Contracted syphilis, March, 1910. Treatment begun April 11th, 1910.

First course of nine weekly injections of mercurial cream ended on June 16th, 1910, a rash being still present.

Sixteen days later he was re-admitted to hospital suffering from severe ulceration of the tonsils, and given an injection of calomel ($\frac{3}{4}$ grain), followed by four more weekly injections (calomel $\frac{1}{2}$ grain, mercurial cream 3 grains), under which his throat cleared. After two months rest he began a third course, which consisted of twelve weekly injections of mercurial cream, for part of which time he had also potassium iodide 15 grains t.d.s. During this treatment he developed warty thickening and superficial



PRIVATE M. On day Salvarsan was Injected.



PRIVATE M. Three days after Injection.

ulceration around the right ala nasi, extending into the nostril and on to the upper lip, and the whole of the lower end of his nose became inflamed and thickened. These symptoms persisted, and on December 8th, 1910, he was transferred to Rochester Row.

December 10th, 1910, he was given 0·5 gramme "606" intravenously, the condition on that date being as shown in photograph.

December 12th, 1910.—Ulceration definitely healing.

December 15th, 1910.—All ulceration completely healed; no inflammation of nose (see photograph).

December 27th, 1910.—Given second injection, 0·45 gramme "606." No recurrence of symptoms since.

Wassermann reaction, negative on day of first injection, still negative.

Gunner P. Contracted syphilis, September, 1910, shortly before embarking for England, and developed secondary symptoms on board. Treated with mercurial pills on voyage home; injections of mercury commenced on arrival at Netley. During six weeks in hospital there, and while under regular mercurial treatment, he developed numerous rupial ulcers, became greatly emaciated, and had the usual dirty yellow complexion of severe syphilitic cachexia.

Transferred to Rochester Row, December 11th, 1910, for treatment with "606" and given 0·5 gramme intravenously on same date.

December 16th, 1910.—Some ulcers completely healed; general health and strength greatly improved.

December 22nd, 1910.—Only two ulcers remain. These had healed completely on December 27th, 1910, sixteen days after injection, and he had gained more than a stone in weight.

Discharged hospital on December 31st, 1910, with no active signs of syphilis, and his general health excellent.

Wassermann reaction, strongly positive on transfer, was weakly positive on discharge twenty days later. No test since.

Private B. Admitted to hospital, June, 1909, with a macular rash, extensive ulceration of throat, and general adenitis. Given two courses of injections of mercurial cream, also mercury and iodide of potassium by the mouth, but the ulceration of pharynx persisted, and he continued to lose weight. Between June, 1909, and October, 1910, he spent 440 days in hospital, having been admitted seven times during that period, and on each occasion his throat was affected. Transferred to Rochester Row at the end of December, 1910, for treatment with "606," having been in hospital since August 2nd, during which time his throat was severely ulcerated, as will be seen from the following extracts from his Syphilis Case Sheet:—

"October 21st, 1910.—Ulcer increasing, involving the greater part of the left tonsil and uvula.

"November 7th, 1910.—Ulceration extending; patient finds great difficulty in swallowing.

"November 12th, 1910.—Patient isolated in a special ward. No progress. Put on 'seriously ill' list.

"November 15th, 1910.—Complains of severe pain shooting down throat, great difficulty in swallowing, and can only take liquid food in small quantities at a time.

"November 16th, 1910.—Ulceration extending. Great difficulty in swallowing.

"November 18th, 1910.—Patient fed through a tube.

"November 20th, 1910.—Tube discontinued.

"November 30th, 1910.—Improving. Able to take solid food."

January 4th, 1911.—Very extensive ulceration of pharynx and epiglottis. View of glottis not obtainable owing to extensive frothy mucus obscuring view of arytenoids, which may or may not be affected. Voice indistinct and feeble. Given 0·55 gramme of "606" intravenously; tracheotomy instruments were kept ready for twelve hours after the injection, in case local reaction should be severe.

January 9th, 1911.—Improvement in throat very marked. Less mucus in larynx. Vocal cords greatly thickened. Granular thickening also of arytenoids. Ulceration of pharynx greatly improved. Voice better.

January 17th, 1911.—Second injection, 0·55 gramme "606" intravenously. Continued rapid improvement.

January 22nd, 1911.—Ulceration healed.

January 30th, 1911.—Has gained 1 stone 4 lb. during last three weeks.

February 3rd, 1911.—Discharged hospital to duty.

Wassermann reaction, strongly positive on transfer, was still positive on discharge.

Private B. Contracted syphilis September, 1910. Treatment began October 10th, 1910, with nine weekly injections of salicylate of mercury (each 1½ grains), followed by one month's interval, at the end of which time he was re-admitted to hospital with severe ulceration of throat and tonsils. Given two more injections of salicylate of mercury, making a total of 16½ grains in four months.

On February 8th, 1911, owing to great enlargements of tonsils and ulceration of pharynx, he was unable to swallow anything solid, and fluids only with difficulty and pain. He was given 0·6 gramme "606" intravenously, and the injection was followed by a sharp reaction. Rapid improvement in his condition took place immediately, and on February 10th, 1911, he could swallow solids easily, and without pain.

February 22nd, 1911.—All ulceration healed, tonsils still somewhat enlarged, but shows no active signs of syphilis. Feels well in himself.

February 23rd, 1911.—Discharged hospital to duty.

March 2nd, 1911.—No active signs of syphilis. Given second injection 0·2 gramme.

Gunner F. Acquired syphilis October, 1909. Treatment consisted of

four full courses of mercury, commencing November 29th, 1909, which failed to prevent a succession of mucous patches and ulcers in mouth and fauces, and after fourteen months regular treatment he was transferred to Rochester Row on January 25th, 1911, with ulceration and necrosis of hard palate, and aphonia of four months duration. Laryngoscopic examination showed an inability to approximate completely the vocal cords, which were distinctly thickened, the arytenoids appeared swollen, and there was granular thickening of larynx, but no definite ulcers could be seen.

Injection: 0·6 gramme "606" intravenously on January 26th, 1911, was followed by slight improvement in voice.

On February 9th, 1911, a sequestrum, 1 inch long, was removed from the hard palate, disclosing beneath it a clean granulating surface.

February 16th, 1911. — Given second injection, 0·6 gramme "606" intravenously. Palate perfectly healed, voice much improved, but still husky. No other signs.

Wassermann reaction, strongly positive on transfer, completely negative two weeks later.

March 10th, 1911.—Voice still improving.

Private P. Placed on syphilis register February 12th, 1909. His syphilis was of ordinary severity, and all symptoms except ulceration of palate and pharyngeal walls were controlled by mercury.

During the last twelve months this ulceration has been active, and on his transfer to Rochester Row, December 12th, 1910, it was stated to be worse than it had ever been. Treatment during first eight months, mercury by mouth; then one course of mercurial inunctions, followed by six injections of mercurial cream (total 6 grains). Further mercurial treatment and tonics were given without any benefit.

December 12th, 1910.—Injection, 0·5 gramme "606" intravenously.

December 30th, 1910.—Ulceration completely disappeared. No active signs of syphilis.

December 31st, 1910.—Second injection, 0·4 gramme "606" intravenously.

January 6th, 1911. — Discharged hospital, weight increased from 9 st. 13 lb. to 10 st. 8 lb.

March 10th, 1911. No further signs of syphilis.

Private R. Contracted syphilis in March, 1907, and continued under regular treatment for three and a-half years, with inunctions, intramuscular injections of mercury, injections of atoxylate of mercury, and of soamin at various times, but these had no effect in preventing a constant succession of mucous patches and ulcers on the tongue, and he was admitted on October 8th, 1910, the tongue being covered with minute fissures, and the buccal mucous membrane with mucous patches. Injection of 0·6 gramme of "606" on same date in two sites, one of which subsequently sloughed, was followed by rapid improvement, and on

November 12th, 1910, the tongue had completely healed. No relapse had occurred by March 11th, 1911. Wassermann reaction, strongly positive on day of injection, became negative to the original, but was still positive to Stern's test on February 18th, 1911.

Gunner C. Contracted syphilis January, 1910. In hospital forty-five days for severe primary and secondary symptoms. Re-admitted two months later on account of mouth lesions, and treated with thirty-four daily inunctions. Two months later he was again re-admitted with similar symptoms, and received the same treatment; twenty-seven days later he was transferred to Rochester Row for treatment with "606." His condition on transfer was as follows: The whole buccal mucous membrane was covered with mucous patches, the cheeks being especially affected, while the tonsils were superficially ulcerated.

November 21st, 1910.—Injection of 0·5 gramme "606" intravenously, followed by slight reaction.

November 26th, 1910.—Ulceration of tonsils completely healed, many of the mucous patches have entirely disappeared, and others are healing rapidly.

November 30th, 1910.—All symptoms disappeared, with exception of small mucous patch on right cheek.

December 3rd, 1910.—No active signs.

December 6th, 1910.—Discharged hospital.

Wassermann reaction, positive on transfer, negative to the original test fifteen days later, but still weakly positive to Stern's method. No test since.

March 10th, 1911.—No further signs of syphilis.

Private A. Contracted syphilis February, 1907, and treated with regular courses of mercurial injections till May, 1909, when struck off syphilis register, having been free from symptoms for ten months. Relapsed on January 7th, 1910, when fissuring and ulceration of tongue commenced. These steadily grew worse, in spite of treatment with three courses of mercurial injections, and on November 26th, 1910, he was readmitted to Rochester Row with a large fissure, ulcerated at the edges, extending over an inch on the dorsum of tongue. The whole tongue was greatly thickened, especially along the left border, where there was a gummatous nodular enlargement. On the same date (November 26th, 1910) he was given 0·5 gramme "606" intravenously. General reaction slight, but tongue very painful after injection.

November 30th, 1910.—All ulceration ceased.

December 7th, 1910.—Substance of tongue much softer, fissures still present but healthy. No pain or inflammation. The nodular thickening along left border has disappeared.

December 8th, 1910.—Discharged hospital.

January 12th, 1911.—Tongue looks quite healthy. No other signs.

Wassermann reaction, positive on admission, was negative on January 12th, 1911. No test since.

March 10th, 1911.—No further signs of syphilis.

Private R. Acquired syphilis end of February, 1910. Admitted to Rochester Row March 26th, 1910, and remained an in-patient for 125 days. Treated with mercury injections (12 grains of metallic mercury) and much local treatment to a succession of mucous patches, which were very resistant, especially on lip. After being eighty days out of hospital, readmitted October 15th, 1910, with large ulcerating patch on lower lip, and numerous mucous patches in mouth generally.

October 15th, 1910.—Injection, 0·6 gramme "606" intramuscularly.

October 28th, 1910.—Lip healed and mouth well.

February 28th, 1911.—No further signs.

March 10th, 1911.—No symptoms of syphilis. His Wassermann reaction however has remained positive.

Driver U. Placed on syphilis register May 9th, 1910. From an early date in the course of the disease he suffered from mouth lesions, mucous patches and ulcers on tongue, buccal mucous membrane, &c. Treated with inunctions (twenty-eight), and calomel cream injections (total 6½ grains), arsacetin one course, and general tonics, together with local treatment to mouth. Mouth lesions persisted.

December 12th, 1910.—Transferred to Rochester Row. Injection of 0·5 gramme "606" intravenously.

December 26th, 1910.—Ulceration healed, and mucous patches disappeared.

December 27th, 1910.—Second injection, 0·45 gramme "606" intravenously.

December 31st, 1910.—Discharged hospital. No signs of syphilis.

March 9th, 1911.—No further signs.

Wassermann reaction negative on admission, still negative, December 31st, 1910; no test since.

Private C. Acquired syphilis January, 1910. Placed on register, March 19th, 1910. In spite of treatment by intramuscular injections of mercury (total mercury 15 grains), as well as local treatment, there remained numerous ulcers on soft palate and fauces at the end of eight months; persistent syphilitic psoriasis followed, with severe alopecia and mucous patches on tongue, none of which yielded to mercurial treatment; he was transferred on February 1, 1911, to Rochester Row.

He then had syphilitic psoriasis on the flexor aspects of elbows and knees, on the buttocks and over the sacrum, on the penis and scrotum, and all over the scalp, where there was severe alopecia. Lips and nasal orifice showed ulceration with fissures and crusts, and there were numerous mucous patches on the tongue.

February 2nd, 1911.—Injection, 0·55 gramme "606" intravenously was followed by rapid improvement.

February 6th, 1911.—Tongue quite healthy, ulceration of nose and lips almost healed, only faint brown staining of former psoriasis. General health much better.

February 16th, 1911.—Second injection, 0·6 gramme "606."

February 17th, 1911.—All symptoms have entirely cleared up except the alopecia, which is definitely improving.

March 4th, 1911.—Discharged hospital to duty.

Gunner M. Placed on register September, 1908. Disease followed an ordinary course till August, 1910, when a large indolent ulcer appeared on the left thigh. He was admitted to hospital November 28th, 1910, a deep gummatous ulcer having subsequently developed on the left tonsil and soft palate, while the ulcer on his thigh showed a tendency to break down again. He had then received six full courses of mercury by injection (total mercury, 38 grains) at regular intervals: a seventh course had to be interrupted on account of tender gums, and he was then given potassium iodide. When transferred to Rochester Row on December 12th, 1910, there was a large perforating ulcer of the soft palate embracing part of the left posterior pillar of the fauces and tonsil.

December 12th, 1910.—Injection of 0·5 gramme "606" intravenously.

December 14th, 1910.—Throat much more comfortable.

December 17th, 1910.—Continued improvement.

December 22nd, 1910.—Second injection, 0·4 gramme "606" intravenously.

January 2nd, 1911.—Ulceration still present, but rapidly disappearing.

January 14th, 1911.—Tonsil quite healed. No other signs.

January 16th, 1911.—Discharged to duty.

Wassermann reaction, strongly positive on transfer, still positive on March 4th, 1911. No other signs of syphilis.

Lance-Serjeant K. Contracted syphilis in 1904. Six years mercurial treatment, terminating December 28th, 1910.

December 2nd, 1910.—Patient re-admitted to Rochester Row with loss of voice, thickening and œdema of the epiglottic folds, vocal cords red and inflamed. Wassermann reaction positive. Treatment with injections of mercurial cream continued without effect till December 28th.

January 3rd, 1911.—0·5 gramme "606" injected intravenously, followed by rather severe reaction.

January 6th, 1911.—Voice much improved. Patient feels quite well.

January 11th, 1911.—Voice continues to improve.

January 16th, 1911.—Second injection of 0·5 gramme intravenously followed by no reaction. Voice very much better.

January 24th, 1911.—Inflammation of larynx disappeared. Voice normal. Discharged hospital.

March 15th, 1911.—Has used his voice regularly for drilling on the parade ground since February 1st, 1911.

Private D. Primary chancre in 1906. Thirty months treatment with calomel, mercurial cream, &c.

Struck off syphilis register on July 16th, 1909, after being ten months clear of symptoms.

April, 1910.—Noticed testicle to be painlessly enlarging.

November, 1910.—Gummatous infiltration of skin appeared in various parts of body, especially limbs, and continued to spread, the surface becoming ulcerated in places.

January 14th, 1911.—Admitted to Rochester Row. Condition then as above, but both testicles affected, being greatly enlarged and adherent to scrotum, which was ulcerated. Injection, 0·6 gramme "606" intravenously.

January 16th, 1911.—Testicles softer and smaller, skin of scrotum can be picked up between fingers.

January 21st, 1911.—Continued improvement. All open ulcers healed.

January 28th, 1911.—Second injection, 0·55 gramme intravenously.

February 1st, 1911.—Discharged hospital. Testicle rapidly decreasing in size and hardness. All ulcers healed.

Private K. Contracted syphilis end of October, 1910, and treatment commenced on November 24th, 1910, during primary stage, with three injections of calomel cream (¼ grain each) at weekly intervals. Secondary rash, with severe ulceration of pharynx, developed while treatment was being continued with injections of mercurial cream (mercury, 1 grain in each), and towards the end of December, 1910, albumin appeared in the urine. Treatment with mercury had to be suspended, as the albumin increased markedly after the next injection. Œdema of ankles and eyelids supervened, the urine became greatly diminished in quantity, and the albumin increased. After a cautious trial of mercury had again increased the amount of albumin in the urine, he was given an intravenous injection of Salvarsan (0·55 gramme) on January 23rd, 1911, there being then a tenth albumin.

The following day there was no albumin. On the third and fourth days following the injection a slight amount was detected, and since then a very slight amount has been found every three or four days, its presence being indicated by a very faint haze on boiling. The ulceration of the pharynx, which had become very much worse during the time the mercury was suspended, commenced to heal from the second day, and on February 6th, 1911, when a second injection of Salvarsan (0·5 gramme) was given, there was no sign of syphilis. Wassermann reaction, strongly positive on the day of the first injection, is now completely negative.

March 10th, 1911.—No further signs of syphilis.

Police Constable M. Acquired syphilis in 1904; treated for fifteen months in civil hospital with mercury by mouth. No further signs till two years ago, when a gumma appeared on forehead, which ulcerated, leaving a deep scar. On January 28th, 1911, developed pains in head, with diplopia, mydriasis, and ptosis of left eye. February 17th, 1911, admitted to Military Hospital, Rochester Row, when examination showed: Paresis of left external rectus, causing diplopia, left pupil dilated and some ptosis.

No fundus changes. Vision : R. $\frac{6}{9}$ and reads D ·8 at 18 inches, L. $\frac{6}{9}$ and reads D ·8 at 18 inches. Slight weakness of face muscles on left side; no other cranial nerves affected. Patella reflexes very active, the right distinctly more so than the left; right patella and ankle clonus. All deep reflexes increased in right upper limb. No other signs. General health good. Weight 13 st. 6 lb. Urine normal. Wassermann reaction, positive.

February 20th, 1911.—Injection of 0·4 gramme "606" intravenously, followed by slight headache localised over left eye. No other reaction.

February 22nd, 1911.—Left pupil now only slightly dilated; ptosis and diplopia much less marked.

February 23rd, 1911.—Ankle and patella clonus disappeared; ankle and elbow jerks on right side greatly diminished, and about equal in intensity to left.

February 24th, 1911.—Very slight diplopia, pupils equal, and ptosis scarcely perceptible. Vision $\frac{6}{6}$ each eye.

February 25th, 1911.—Discharged hospital, all symptoms having disappeared, with the exception of very slight ptosis.

Lance-Corporal L. Contracted gonorrhœa in April, 1910, for which he was under treatment at Rochester Row.

On May 3rd, 1910, developed fever with pain in lumbar region. Examination showed a dull patch under the left scapula but no other signs. Transferred to the Queen Alexandra Military Hospital, where pericarditis with effusion subsequently developed. Pericardial signs cleared up under treatment with gonococcus vaccine. On May 31st developed a macular rash, with general adenitis; positive Wassermann. He was given mercury by mouth.

Transferred to Rochester Row on July 30th, 1910, and treated with injections of mercurial cream. Appeared to regain his strength very slowly, and while in Rochester Row hospital complained of weakness in legs, which was attributed to general debility, and he was sent on furlough for change of air. While on furlough his legs steadily became weaker; he was admitted to Queen Alexandra Military Hospital on November 9th, 1910, suffering from paraplegia, when the following note was made:—

"Moves legs in bed with difficulty, loss of power chiefly extensor; sensory changes nil; wasting of all muscles of both legs, especially extensors, in which reaction of degeneration present; knee jerks absent, sphincters normal.

"November 15th, 1910.—0·4 gramme "606" injected intravenously, followed by smart reaction.

"November 16th, 1910.—Undoubted improvement in power.

"November 20th, 1910.—Can move legs much better.

"November 25th, 1910.—Subcutaneous injection, "606" 0·4 gramme. Can bend up knees quite easily.

"December 7th, 1910.—Can get up and propel himself supported in arm-rest.

"December 15th, 1910.—Legs still atrophic. Can easily lift them off the bed against pressure, can walk with aid of wheeled crutch.

"January 7th, 1911.—Walks without aid of chair or stick, though unsteadily. Improvement continued till middle of February, 1911, when he suddenly developed difficulty in protruding his tongue, the loss of power being mainly on the right. There was also some confusion of mind. All paretic symptoms disappeared in a few days, but his manner is still abnormal, and he is counted as a relapse. A third injection was refused.

In an investigation into the value of a remedy for a disease such as syphilis, which causes much inefficiency through residence in hospital, an important question is the saving it is likely to effect in the number "constantly sick." We do not think, however, that the time has yet arrived for us to make any pronouncement on this question, and can only say that, in spite of the fact that a large proportion of the cases we have treated with Salvarsan were of the type which is responsible for raising the "constantly sick" figure, the average duration of stay in hospital of our patients treated in this way has been less than that of the cases treated at Rochester Row during 1909 before Salvarsan was introduced.

TABLE I.—Wassermann Reactions before and after a Subcutaneous or Intramuscular Injection of Salvarsan.

	As Tested by the Original Method								As Tested by Stern's Modification							
Weeks after injection	Reaction originally positive	Out of which				Reaction originally negative	Out of which		Reaction originally positive	Out of which				Reaction originally negative	Out of which	
		Remained positive	Reaction became weaker	Reaction became negative	Reaction returned to positive after becoming negative		Remained negative	Changed to positive		Remained positive	Reaction became weaker	Reaction became negative	Reaction returned to positive after becoming negative		Remained negative	Changed to positive
1–3	32	21	4	7	0	19	17	2	42	30	10	2	0	3	1	2
3—5	25	8	5	10	2	7	6	1	29	17	7	5	0	2	1	1
5–12	52	5	1	44	2	19	16	3	66	18	7	36	5	3	3	0
12—16	20	1	2	14	3	6	6	0	24	5	2	12	5	1	1	0
16–26	32	2	1	17	12	8	7	1	36	6	0	14	16	2	2	0

One of us (L. W. H.) has tested the blood serum of every case before and, as far as possible, at regular intervals after the

injection, and the results of the 960 tests carried out on the various sera before and after each plan of administration are shown in the Tables I., II., and III. The tests were carried out in the manner described in THE ROYAL ARMY MEDICAL CORPS JOURNAL for July, 1910.

TABLE II.—WASSERMANN REACTIONS BEFORE AND AFTER A SINGLE INTRAVENOUS INJECTION OF SALVARSAN.

	As Tested by the Original Method.								As Tested by Stern's Modification.							
Weeks after injection	Reaction originally positive	Out of which				Reaction originally negative	Out of which		Reaction originally positive	Out of which				Reaction originally negative	Out of which	
		Remained positive	Reaction became weaker	Reaction became negative	Reaction returned to positive after becoming negative		Remained negative	Changed to positive		Remained positive	Reaction became weaker	Reaction became negative	Reaction returned to positive after becoming negative		Remained negative	Changed to positive
1—3	10	3	5	2	0	3	3	0	13	12	0	1	0	0	0	0
3—5	6	0	1	5	0	2	2	0	7	2	1	4	0	0	0	0
5—12	19	1	0	17	1	4	4	0	21	2	4	13	2	0	0	0
12—16	6	0	0	3	3	2	0	2	8	0	0	6	2	0	0	0

TABLE III.—WASSERMANN REACTIONS BEFORE AND AFTER TWO OR MORE INTRAVENOUS INJECTIONS OF SALVARSAN.

	As Tested by the Original Method							As Tested by Stern's Modification								
Weeks after injection	Reaction originally positive	Out of which				Reaction originally negative	Out of which		Reaction originally positive	Out of which				Reaction originally negative	Out of which	
		Remained positive	Reaction became weaker	Reaction became negative	Reaction returned to positive after becoming negative		Remained negative	Changed to positive		Remained positive	Reaction became weaker	Reaction became negative	Reaction returned to positive after becoming negative		Remained negative	Changed to positive
1—3	31	20	6	5	0	12	12	0	28	20	4	4	0	6	4	2
3—5	24	7	5	12	0	6	6	0	22	11	4	7	0	4	4	0
5—12	26	6	1	18	1	6	6	0	21	7	4	10	0	5	4	1

In explanation of the various columns: (*a*) "Remained positive" indicates that the sera had shown no change in strength of reaction from the date of injection to that of the test; (*b*) "became weaker" means, in the case of the original method, that the sera originally deviated 0·2cc. complement, and later 0·1cc. only, or originally deviated 0·1cc. and later showed only incomplete hampering of complement; in that of the Stern method, that the sera originally deviated with 0·03cc. extract, and later, only with twice that amount; (*c*) "became negative" indicates that hæmolysis was as rapid and complete as in the case of the control sera; (*d*) "returned to positive after being negative" that the sera in question had given a negative reaction at some time subsequent to the injection.

It will be seen from the tables that the Wassermann reaction does not disappear nearly so quickly as the symptoms. If it were possible to publish the records of the tests carried out on each case subsequently to the injection, it would be seen that in those cases which become negative, as a general rule there is first a weakening in the strength of the positive reaction, which is followed by a negative reaction to the original method and, finally, by a negative reaction to Stern's modification. This gradual disappearance of the reaction seems to us to indicate a gradual excretion of the disease products which give rise to it, just as foreign albumins are excreted, and not necessarily that the parasites are only gradually destroyed. In other words, the sudden cessation of manufacture of the disease products which give rise to the reaction leaves the body with a certain accumulated amount of these to excrete.

As we indicated in commencing this paper, we do not think the time has yet arrived to pronounce any judgment as to the place which Salvarsan will finally occupy in the therapy of syphilis. Meantime our observations appear to justify the following conclusions:—

(*a*) Salvarsan has a marked and rapid effect on the various manifestations of syphilis.

(*b*) This effect is distinctly more rapid than that following the administration of mercury, and is often very pronounced when the latter drug has failed to produce any impression on the disease.

(*c*) The rapid disappearance of treponemata from local sores, in which they abounded previously to the injection, and the effect on the Wassermann reaction in the majority of cases, indicate that the clinical effects are due to a specific action of the drug on the parasites, and therefore that treatment by Salvarsan is not merely symptomatic.

(*d*) Whether this action consists in destruction of the parasites or is simply a temporary suppression of their activity we are not prepared to say.

(*e*) In view of (*a*) (*b*) and (*c*) Salvarsan is a valuable remedy in the treatment of syphilis and adverse judgment on the score of relapses will be unjustifiable till the best method of administering it has been discovered.

We desire to record our thanks to Herr Geheimrat Professor Ehrlich for his generosity in repeatedly renewing our supply of "606" till the remedy was placed on the market, and for his courtesy in replying to the inquiries we addressed to him from time to time concerning it.

ON THE FATE OF ARSENIC IN THE BODY AFTER INJECTION, IN THE FORM OF SALVARSAN OR "606."

By Major W. W. O. BEVERIDGE, D.S.O., and
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Our investigations were confined to the following :—

A. The excretion of arsenic in the urine.

B. The presence of arsenic at the site of subcutaneous and intramuscular injections.

(A) The Excretion by the Urine.

It would appear that the method of injection tends to influence both the actual rate of secretion and the daily amount excreted, for as pointed out by Greven (*Münch. med. Woch.*, No. 40, 1910), in the case of subcutaneous injection, arsenic is to be found in the urine up to the seventeenth day, and where combined with mercury up to the twenty-fifth day, while in the case of intravenous injection, according to Fischer and Hoppe (*Münch. med. Woch.*, No 29, 1910), it ceased to be excreted after the third day. We have found, however, that in the case of intravenous injection the urine is not free until the ninth, tenth, or eleventh day, but in our cases the amount injected (0·55 gramme) was nearly double that used in the case recorded by Fischer and Hoppe, which may well account for the lengthened period of elimination. In the case of subcutaneous and intramuscular injections we have had so far no opportunity of determining the period of elimination. Arthur Bornstein (*Deutsch. med. Woch.*, No. 3, 1911), however, states that arsenic could be demonstrated after intramuscular injection for as long as three weeks. This observer proved from experiments on rabbits that the excretion in the combined urine and fæces forty hours after injection of 0·025 gramme Salvarsan amounted, in the case of intravenous injection, to 1·2 milligramme, and only to 0·4 milligramme after subcutaneous injection. In man, after the intravenous injection, the daily amount excreted by the urine is greater than that after the intramuscular or subcutaneous injection. This is readily accounted for in cases where there is retention of arsenic at the site of inoculation, and this would also probably explain the longer period of elimination, as arsenic gradually enters the circulation from the deposit, and is either eliminated by the excreta, or stored in the internal organs, where it has been found. Estimation of the amount of arsenic excreted in the urine does not account for the whole amount of the Salvarsan injected, since it has been found

that it is also excreted by the intestines, so examination of the urine alone cannot be the final proof of complete elimination. The excretion by the fæces also varies with the method of injection. In the case of intravenous injection, arsenic persists longer in the stools than in the urine. Organic compounds of arsenic do not appear to be changed in the body into inorganic ones, which would give rise to toxic effects; in our examinations there was no evidence of the presence of arsenious or arsenic acid in the urine.

The samples of urine were collected from patients under treatment at the military hospital, Rochester Row. The collection and measurement for the twenty-four hours in each case was supervised by Major Gibbard, so that the whole amount excreted was accurately noted and sent daily to the laboratory for analysis. The cases usually received their injection about midday, so that the first day's urine is only a twenty-one-hour amount.

The results we have obtained from the examination of the urine of five patients, counting second injections, eight analyses in all, are here tabulated:—

CASE 1.—0·55 GRAMME, INTRAVENOUSLY, AT 1 P.M., DECEMBER 3, 1910.

Date	Amount of urine passed in twenty-four hours (9 a.m. to 9 a.m.)	Amount of urine taken for analysis	Total amount of arsenic in grammes passed in twenty-four hours
December 4, 1910 ..	1,350 cc.	500 cc.	0·058
,, 5 ,, ..	1,180 ,,	500 ,,	0·016
,, 6 ,, ..	1,920 ,,	500 ,,	0 021
,, 7 ,, ..	1,255 ,,	500 ,,	0·023
,, 8 ,, ..	1,860 ,,	500 ,,	*Nil*
,, 9 ,, ..	1,215 ,,	500 ,,	0·019
,, 10 ,, ..	1,620 ,,	500 ,,	0·004
,, 11 ,, ..	1,610 ,,	500 ,,	0·003
,, 12 ,, ..	1,080 ,,	500 ,,	*Nil*
,, 13 ,, ..	1,220 ,,	500 ,,	*Nil*

Total amount recovered = 0·144 gramme

CASE 2.—0·55 GRAMME, INTRAVENOUSLY, AT 1 P.M. JANUARY 12TH, 1911.

Date	Amount of urine passed in twenty-four hours (9 a.m. to 9 a.m.)	Amount of urine taken for analysis	Total amount of arsenic in grammes passed in twenty-four hours
January 13, 1911 ..	1,660 cc.	500 cc.	0·012
,, 14 ,, ..	700 ,,	500 ,,	0·041
,, 15 ,, ..	520 ,,	500 ,,	0·007
,, 16 ,, ..	890 ,,	500 ,,	0·008
,, 17 ,, ..	430 ,,	430 ,,	0·006
,, 18 ,, ..	780 ,,	500 ,,	0·026
,, 19 ,, ..	1,310 ,,	500 ,,	0·024
,, 20 ,, ..	1,040 ,,	500 ,,	0·016
,, 21 ,, ..	1,055 ,,	500 ,,	0·007
,, 22 ,, ..	820 ,,	500 ,,	*Nil*
,, 23 ,, ..	1,040 ,,	500 ,,	,,

Total amount recovered = 0·147 gramme

Second injection (same amount) January 24th.

Date	Amount of urine passed in twenty-four hours (9 a.m. to 9 a.m.)	Amount of urine taken for analysis	Total amount of arsenic in grammes passed in twenty-four hours
January 25, 1911 ..	1,260 cc.	500 cc.	*Nil*
,, 26 ,, ..	650 ,,	500 ,,	0·004
,, 27 ,, ..	910 ,,	500 ,,	0·015
,, 28 ,, ..	1,060 ,,	500 ,,	0·023

Discharged from hospital, January 28th.

CASE 3.—0·55 GRAMME, INTRAVENOUSLY, AT 12 NOON, JANUARY 18TH, 1911.

Date	Amount of urine passed in twenty-four hours (9 a.m. to 9 a.m.)	Amount of urine taken for analysis	Total amount of arsenic in grammes passed in twenty-four hours
January 19, 1911 ..	830 cc.	500 cc.	0·008
,, 20 ,, ..	990 ,,	500 ,,	0·019
,, 21 ,, ..	840 ,,	500 ,,	0 028
,, 22 ,, ..	890 ,,	500 ,,	0 002
,, 23 ,, ..	950 ,,	500 ,,	0·024
,, 24 ,, ..	1,350 ,,	500 ,,	0·008
,, 25 ,, ..	1,150 ,,	500 ,,	0·004
,, 26 ,, ..	1,035 ,,	500 ,,	0·001
,, 27 ,, ..	1,180 ,,	500 ,,	*Nil*
,, 28 ,, ..	1,070 ,,	500 ,,	,,
,, 29 ,, ..	1,620 ,,	500 ,,	,,

Total amount recovered · 0 094 gramme

Second injection, February 2nd (same amount).

February 3, 1911.. ..	1,400 cc.	500 cc.	0·004
,, 4 ,, ...	2,230 ,,	500 ,,	0·026
,, 5 ,, ...	810 ,,	500 ,,	0·008
,, 6 ,, ...	1,085 ,,	500 ,,	0·014
,, 7 ,, ...	1,075 ,,	500 ,,	0·006
,, 8 ,, ...	1,075 ,,	500 ,,	0 017
,, 9 ,, ...	880 ,,	500 ,,	*Nil*

Total amount recovered — 0·075 gramme

Note.— The urines of January 30th and 31st, February 1st and 2nd were examined and found free from arsenic.

CASE 4.—0·55 GRAMME, INTRAVENOUSLY, AT 12 NOON, JANUARY 10, 1911.

Date	Amount of urine passed in twenty-four hours (9 a.m. to 9 a.m.)	Amount of urine taken for analysis	Total amount of arsenic in grammes passed in twenty-four hours
January 21, 1911 ..	1,075 cc.	500 cc.	*Nil*
,, 22 ,, ..	1,048 ,,	500 ,,	,,
,, 23 ,, ..	1,210 ,,	500 ,,	,,

Second injection (same amount), January 23, 1911.

Date	Amount of urine passed in twenty-four hours (9 a.m. to 9 a.m.)	Amount of urine taken for analysis	Total amount of arsenic in grammes passed in twenty-four hours.
January 24, 1911 ..	770 cc.	500 cc.	0·005
,, 25 ,, ..	1,175 ,,	500 ,,	0·014
,, 26 ,, ..	760 ,,	500 ,,	0·003
,, 27 ,, ..	1,270 ,,	500 ,,	0·015
,, 28 ,, ..	820 ,,	500 ,,	0·004
,, 29 ,, ..	1,030 ,,	500 ,,	0·015
,, 30 ,, ..	860 ,,	500 ,,	0·008
,, 31 ,, ..	1,060 ,,	500 ,,	0·020
February 1 ,, ..	990 ,,	500 ,,	0·060
,, 2 ,, ..	1,660 ,,	500 ,,	0·004
,, 3 ,, ..	1,460 ,,	500 ,,	0·005
,, 4 ,, ..	1,690 ,,	500 ,,	*Nil*
,, 5 ,, ..	1,270 ,,	500 ,,	,,
,, 6 ,, ..	1,280 ,,	500 ,,	,,

Total amount recovered = 0·153 gramme

* NOTE.—This was one of the urines used for experiment, but it was free from arsenic before the second injection.

CASE 5.—0·55 GRAMME. INTRAVENOUSLY. AT 12 NOON, FEBRUARY 2, 1911.

Date	Amount of urine passed in twenty-four hours (9 a.m. to 9 a.m.)	Amount of urine taken for analysis	Total amount of arsenic in grammes passed in twenty-four hours
February 3, 1911 ..	365 cc.	365 cc.	0·001
,, 4 ,, ..	1,175 ,,	500 ,,	0·009
,, 5 ,, ..	1,114 ,,	500 ,,	0·016
,, 6 ,, ..	960 ,,	500 ,,	0·068
,, 7 ,, ..	875 ,,	500 ,,	0·005
,, 8 ,, ..	875 ,,	500 ,,	0·0004
,, 9 ,, ..	950 ,,	500 ,,	0·014
,, 10 ,, ..	1,080 ,,	500 ,,	0·0009
,, 11 ,, ..	1,010 ,,	500 ,,	0·007
,, 12 ,, ..	560 ,,	500 ,,	0·001
,, 13 ,, ..	500 ,,	500 ,,	*Nil*
,, 14 ,, ..	960 ,,	500 ,,	,,
,, 15 ,, ..	800 ,,	500 ,,	,,
,, 16 ,, ..	920 ,,	500 ,,	,,

Total amount recovered = 0·122 gramme

Second injection (same amount) February 16, 1911.

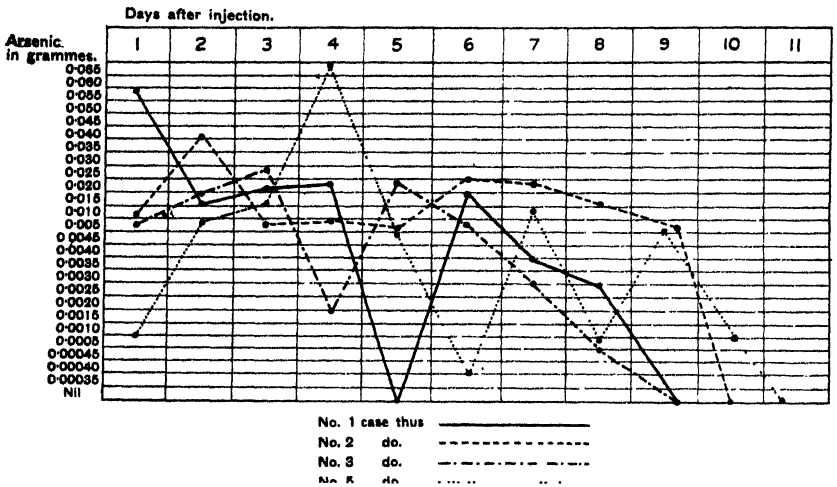
February 17, 1911 ..	910 cc.	500 cc.	0·009
,, 18 ,, ..	1,080 ,,	500 ,,	0·007
,, 19 ,, ..	880 ,,	350 ,,	0·005
,, 20 ,, ..	1,000 ,,	500 ,,	0·015
,, 21 ,, ..	1,015 ,,	500 ,,	0·013
,, 22 ,, ..	900 ,,	500 ,,	0·016
,, 23 ,, ..	960 ,,	500 ,,	0·007
,, 24 ,, ..	1,230 ,,	500 ,,	0·003
,, 25 ,, ..	1,270 ,,	500 ,,	*Nil*
,, 26 ,, ..	575 ,,	500 ,,	,,
,, 27 ,, ..	1,210 ,,	500 ,,	,,

Total amount recovered = 0·075 gramme

(1) It will be seen that the excretion of arsenic ceased on the ninth, tenth, and eleventh day after injection, and in the case of a second injection on the seventh, ninth and twelfth. In the first case all the arsenic was excreted in seven days and in this case no arsenic was found on the fifth day after injection, which can only be accounted for by a temporary retention of arsenic.

(2) The excretion is irregular, but the highest amounts excreted were on the first, second, third and fourth days.

CURVES SHOWING SEQUENCE OF DAILY EXCRETION
(First Injection only).



The Method of Analysis.—The examination of urine for arsenic presents considerable difficulty and is not lightly to be undertaken. Before recording any results we carried out a series of examinations on many cases and by various methods, until we were satisfied that reliable results could be obtained. These were confirmed by either the Marsh-Berzelius method, or by the modified Gutzeit test, and in every case where there was any doubt the analysis was repeated. The process which we consider most applicable, although somewhat tedious, is the separation of the arsenic in the form of the sulphide. In all processes it is first necessary to destroy the organic matter of the urine. This was carried out by the following method: 500 cc. of the urine were rendered alkaline with sodium carbonate, and evaporated to dryness. (The residue can then be fused with sodium nitrate before being precipitated with sulphuretted hydrogen

in hydrochloric acid if desired.) In one or two cases a distinct mirror was observed in the residue, which is difficult to explain, as the temperature during evaporation was never raised above 100° C. The residue was then taken up with 100 cc. of arsenic-free hydrochloric acid and placed in an Erlenmeyer's flask of 500 cc. capacity, 1 gramme of potassium chlorate was added and the whole set aside in the cold for twenty-four hours. After complete destruction of the organic matter and removal of the chlorine, distillation was carried out by Schneider's method as modified by Fischer (*Zeit. f. Analyt. Chemie.*, vol. xxi., 1882), 50 cc. of a 20 per cent. solution of ferrous chloride being added together with 50 cc. water. (The ferrous chloride must be prepared according to the directions given by Fischer, as follows: "Pour over excess of iron filings some hydrochloric acid (20 per cent.), let the first effects of the reaction pass off, then warm until the generation of hydrogen is nearly over and filter. From the solution thus obtained crystals separate out after prolonged standing in the cold.") The flask was connected to a small bulb pipette of 30 cc. capacity by means of a bent glass tube. The extremity of the pipette dipped into a receiver containing 100 cc. of water kept cool preferably by ice, as recommended by Carlson (*Zeit. f. Phys. Chem.*, 1910). Distillation was carried out on a sand bath by means of a low flame, as it is important to distil at as low a temperature as possible. Distillation was stopped when all but about 30 cc. had been collected, for we found by many experiments that all the arsenic had come over in this quantity. This distillate is not always colourless, but the presence of a slight colour is of no consequence. The flask containing the distillate was then placed upon a water bath at a temperature of from 70° to 80° C. and a stream of sulphuretted hydrogen passed through the fluid for from ten to twelve hours. The sulphuretted hydrogen must necessarily be arsenic free. To avoid the disadvantages of using sulphuretted hydrogen, probably the precipitation of the arsenic in hydrochloric solution could be carried out by means of thio-acetic acid, according to the method of Robert Schiff (*Chemical News*, August 9th, 1895) and Mörner. The solution was then allowed to stand for twenty-four hours to ensure the complete separation of the sulphide of arsenic. It was then filtered and the residue washed with sulphuretted hydrogen water until free from chlorides and dissolved up in a solution of ammonium hydroxide 1 to 15, and evaporated to dryness. The impure sulphide thus obtained was then purified by oxidation with nitric acid and the process repeated until all organic matter had

disappeared, when a little sulphuric acid was added and the mixture heated until white fumes were given off.

The residue was then taken up in hydrochloric acid, diluted with water, and sulphuretted hydrogen again passed. The sulphide was collected on a filter, and washed successively with alcohol, ether, carbon-bisulphide, to remove any sulphur present, and finally with alcohol to remove the bisulphide of carbon. The sulphide of arsenic remaining was dissolved up in ammonia solution, evaporated to dryness and weighed. If the sulphide at this stage did not appear quite pure, it was again taken up in hydrochloric acid, and reprecipitated with sulphuretted hydrogen, and treated as before. Before deciding on this method, we tried the Marsh-Berzelius test, also using the electrolytic apparatus of Thorpe, but for dealing with large quantities of urine quantitatively, the gravimetric method is preferable, although the Marsh test is valuable for confirmation.

Among other methods tried we may mention the following:—

(1) Hanzeau's direct and indirect volumetric method by absorption with slightly acidulated nitrate of silver (*Compt. Rend.*, lxxv.).

(2) The method of treating Schneider's distillate with ether and titration with iodine given by Carlson (*Zeit. f. Phys. Chem.*, 1910).

(3) E. Salowski's method (*Zeit. f. Phys. Chem.*, 1908).

(4) The ammonio-magnesium precipitation method.

(5) Bettendorff's method.

(6) Mörner's method.

(B) The Presence of Arsenic at the Site of Injection.

The analytical results obtained in the case of pus or sloughs removed from the site of a subcutaneous or intramuscular injection at the Military Hospital, Rochester Row, have shown conclusively that a large proportion of the arsenic contained in the injection is retained in the tissues at the site of inoculation. It would appear that a certain amount of caustic action is set up, with some destruction of tissues, accompanied in some cases by the formation of pus. The pus itself appears to contain at the most only traces of arsenic, which it gathers from the immediate area of the deposit in the tissues. It was noticed that pieces of tissue sent for examination did not putrefy when left exposed to the air, which, doubtless, is due to the preserving action of the arsenic. We understand that the pieces of tissue or sloughs removed did not include the whole area affected as regards depth, so when a quantitative estimation of arsenic is given, this would in all probability not completely represent the total amount retained at the site of

injection. It will be seen that a considerable proportion of arsenic has been found, varying from 9 to 29 milligrammes; in some cases about 20 per cent. (or calculated in terms of arsenic 50 per cent.), of the amount of Salvarsan injected was recovered.

That the arsenic is only very slowly absorbed into the circulation from the deposit in the tissues is shown in one or two cases here recorded, when even after 111 and 134 days had elapsed since the injection as much as 0·029 gramme and 0·028 gramme could be recovered. If left to Nature, probably in time it would be thrown off by ulcerative processes, before it was all absorbed. The opening of an abscess or removal of a scab may give rise to the objection that some of the arsenic is removed from the body; undoubtedly this must be the case, as even after 134 days a considerable amount of arsenic is found, which differs from the results obtained by Plaut and Bornstein, who found only minute quantities at the site of inoculation twenty-four days after injection (*Deutsch. med. Woch.*, No. 3, January, 1911).

Fischer and Hoppe (*Münch. med. Woch.*, No, 29, July, 1910) state that according to Ehrlich's views, the new arsenic preparation is not organotropic; hence a great quantity of arsenic must not be expected in the body organs. The *post-mortem* examination on a female fourteen days after injection revealed no arsenic in the internal organs, but at the site of injection considerable quantities were found, proving that with intramuscular injection appreciable deposits of arsenic may remain at the site of injection unnoticed for some time. Another autopsy on the thirty-sixth day after injection revealed considerable quantities of arsenic, amounting to about 0·01 gramme, in the glutei muscles.

Record of Examinations for Arsenic of Material from the Site of Subcutaneous or Intramuscular Injection of Salvarsan.

Case number	Date of injection	Amount of Salvarsan injected	Nature of material removed	Date of removal from the patient	Number of days after first injection	Weight of material removed	Examination for arsenic	
							Qualitative	Quantitative
1	15.10.10	0·65 gm.	Pus	5.11.10	21	..	Traces	—
2	10. 9.10	0·60 ,,	,,	6.12.10	88	..	Traces	—
3	14.10.10	0·60 ,,	Slough	10.1. 11	89	..	Present	—
4	26.10.10	0·65 ,,	,,	16.1. 11	83	..	None	—
5	11.10.10	0·60 ,,	,,	18.1. 11	100	3·0 gm.	Present	0·0094 gm.
6	3.11.10	0·60 ,,	Pus	14.2. 11	104	..	None*	—
7	7.10.10	0·40 ,,	Slough	17.2. 11	134	8·889 gm.	Present	0·0288 gm.
8	3.11.10	0·60 ,,	,,	21.2. 11	111	3·7766 ,,	Present	0·0292 ,,
9	3.11.10	0·60 ,,	Slough and pus	21.2. 11	111	About 1 gm.	Present*	0·0004 ,,

* From the same case; although no arsenic was found in the pus on the first examination, it was found later in the combined specimens of slough and pus, indicating that there is little or no absorption of arsenic from the slough.

METHOD OF TREATING THE PUS OR SLOUGH FOR DETECTION AND ESTIMATION OF ARSENIC.

(1) *Qualitative Examination.*—The pus or tissues, very finely minced, are placed in a beaker with the addition of a small quantity of water, according to the amount of material taken. Hydrochloric acid and chlorate of potash are added and the beaker is kept in a warm place for a few hours. Afterwards it is heated gently over a sand-bath until oxidation is complete, and no more chlorine remains. Bromine water is then added in excess to destroy any sulphites or hypophosphites which are present. The solution is warmed and then boiled, to drive off the bromine vapour completely, filtered while still hot and then cooled. The liquid is then diluted with distilled water, and any arsenic sought for by means of a modified Gutzeit test as follows :—

Hydrogen is generated by means of sodium amalgam, a piece the size of a pea being placed in the solution in the beaker and a second if necessary. The mouth of the beaker is rapidly covered with a filter paper which has been moistened, within a ring drawn by means of a graphite pencil, with either a solution of perchloride of mercury or nitrate of silver, the whole again covered by another paper to exclude the light, and confined by an elastic band. A filter plug of cotton wool should not be used as it is liable to decompose the arsine, acting as a positive catalyzator. After the action has subsided, if arsenic is present the filter paper will be found to be stained from yellow to deep orange-brown in the case of perchloride of mercury, or yellow to dark brown in the case of nitrate of silver. The test must not be continued too long. As a confirmatory test, the stained paper can be treated with boiling hydrochloric acid. If the colour is due to sulphuretted hydrogen it will dissolve, if due to phosphuretted hydrogen a bright yellow colour is formed, if due to stibine, a grey, but if due to arsenic it changes to a brick-red.

The test is delicate and in our hands has answered admirably, but it is obvious that all the reagents must be carefully tested to insure the absence of arsenic.

The test can be applied to Schneider's distillate from urine. The examination can also even more satisfactorily be carried out by electrolysis in a U-shaped voltameter.

(2) *Quantitative Examination.*—The sample is minced as fine as possible and weighed. The organic matter is destroyed in the same manner as for a qualitative examination, and bromine added. When the solution is quite clear, a saturated solution of sulphur

dioxide is added, the beaker warmed, and the contents finally boiled to remove all trace of the gas. Sulphuretted hydrogen is then passed until all the arsenic is precipitated as the sulphide, and the whole allowed to remain for some hours for complete settlement. The impure sulphide is filtered off and washed free of chlorine by means of sulphuretted hydrogen water. It is then dissolved in ammonia water (1 in 15), and evaporated down to dryness, oxidised by means of nitric acid, sulphuric acid, and 10 cc. of a $\frac{1}{2}$ per cent. solution of potassium permanganate, evaporated down and taken up with hydrochloric acid. The solution is then diluted with water and sulphuretted hydrogen again passed. The sulphide, which should now be nearly pure, is treated as mentioned for the estimation in urine, and weighed. If the resulting sulphide is not pure, the process of re-precipitation must be carried out again and again. It is important to be sure that the resulting precipitate is of the pure lemon colour characteristic of sulphide of arsenic.

FURTHER RESULTS OF THE EXPERIMENTAL TREATMENT OF TRYPANOSOMIASIS, BEING A PROGRESS REPORT TO A COMMITTEE OF THE ROYAL SOCIETY.[1]

By H. G. PLIMMER, F.R.S., W. B. FRY, Captain R.A.M.C., and H. S. RANKEN, Lieutenant R.A.M.C.

The following results are a continuation of the work of which summaries have already appeared in the *Proceedings of the Royal Society*.[2]

These experiments have been carried out with the same strain of surra as was used before, at the Brown Institution and at the Elstree Farm of the Lister Institute.

Further Experiments with Antimony upon Dogs by New Methods.—In the last Report[3] we summarized the results obtained by treating dogs suffering from surra with antimony. We found that in some dogs the subcutaneous or intramuscular administration of antimony or of its salts caused inflammatory swellings and often abscesses, with much constitutional disturbance, and therefore, although certain good results had been obtained, the method seemed impracticable for the treatment of animals upon a large scale. We then tried the effect of *intravenous* injections of the salts of antimony and even of the metal itself, and this would seem at present to be the most promising method of giving antimony, for if the injection of the metal into the veins be carried out successfully no irritation is caused. If the salts be injected in solution the elimination is so rapid that no good result can be obtained in the acute form of trypanosomiasis with which we have been working, so the actual injection of the metal itself has been successfully carried out in now a large number of instances. In the last two Reports mentioned above experiments have been recorded with antimony (metal) in a state of extremely fine division, and it was shown that it was relatively much more powerful than the salts in its action upon trypanosomes, and that its effects lasted much longer than those of the salts. The particles of metal, which are very minute—they vary roughly from 0·5 μ to 2·5 μ—are taken up

[1] Reprinted from the *Proceedings of the Royal Society*, B, vol. 83.

[2] 1907, B, vol. 79, pp. 500—516; 1908, B, vol. 80, pp. 1—12, and 477—487; 1909, B, vol. 81, pp. 354—371.

[3] *Roy. Soc. Proc.*, B vol. 81, p. 367.

by the leucocytes, and some compound which is soluble in the *liquor sanguinis* is apparently formed by them. We are not certain what happens: but in rabbits stained films of blood, taken at various intervals after the intravenous administration of the metals, seem to show that the leucocytes go on taking up the particles until they can contain no more, and then disintegrate at varying periods afterwards, thus providing a constant, though small, supply of antimony. The disintegration would seem to be due to the destruction of the leucocytes by the antimony they have taken up, but on the other hand, many of the leucocytes which have not taken up too much appear to be quite healthy. We have found that both cerebro-spinal fluid and blood serum are, as far as a solution of any trypanocidal substances is concerned, by themselves quite without action on metallic antimony, even when kept in contact with it for periods up to three days. Experiments were undertaken with these fluids after their contact with the metal both on infected animals and upon trypanosomes *in vitro* with entirely negative results.

The time at which no more particles can be found in, or in which they disappear from, the leucocytes, varies in the different animals; in rabbits they can be found for three or four days; in horses we have not found them after three days; and in dogs not after two.

Sufficient soluble antimony is formed in all these animals after an appropriate dose of the metal to drive the trypanosomes out of the peripheral blood in about two and a-half hours; that is, more than double the time taken by the soluble salts to attain the same result.

We have not had in rabbits, dogs, or horses any plugging of capillaries with the metal, but the animals appear to be more sensitive to over-dosage with the metal than with the salts. Testing the dosage on healthy uninoculated animals is also fallacious, as a fatal dose to a healthy animal is apparently borne well by a similar animal when its blood is full of trypanosomes; we believe, also, that in the same animal a large dose is better borne when the blood contains trypanosomes than when it is free.

When antimony in this form is prepared in larger quantities, it becomes more difficult to remove impurities from it. We mention this as we have had deaths from doses which had previously been well borne, which we attribute to these impurities, but these difficulties are now overcome.

Of the twenty-six dogs treated with antimony, the details of which are given in the last Report, one (No. 1) lived for over fifteen

AVERAGE DURATION OF UNTREATED DISEASE : FOURTEEN DAYS.

No.	Weight in kilos	No. of doses	Substance used and quantity of dose	Recurrences	Remarks	Gain or loss of weight	Subinoculations from organs
						kilos	
27	9½	18	6 m. 5 per cent. lith. ant. tart. diluted intramuscularly	1	*Living* 1 *year* 121 *days after inoculation*	+ ½	
28	10¼	9	8 m. 5 per cent. lith. ant. tart. diluted, intramuscularly	1	Died on 75th day from pneumonia	+ 3	Negative.
29	9¾	10	7 m. 5 per cent. lith. ant. tart. diluted, intramuscularly	1	,, on 84th .. ,, ...	+ 1	,,
30	9	12 3	6 m. 5 per cent. lith. ant. tart. diluted, intramuscularly 50 mg. ant., intravenously	3	,, on 168th day with nervous symptoms, "fits"	− 1¼	Positive from C.S.F.
31	8½	9 3	6 m. 5 per cent. lith. ant. tart. diluted, intramuscularly 20 m. 5 per cent. lith. ant. tart. diluted, intravenously	2	,, on 87th day : kidneys inflamed	− 1	Negative.
32	11	4 2	20 m. 5 per cent. lith. ant. tart. diluted, intravenously 80 mg. ant., intravenously	1	,, on 154th day, 3 months after last dose. Spleen large.	+ 1¼	,,
33	9	2 4	20 m. 5 per cent. lith. ant. tart , intravenously 60 mg. ant., intravenously	1	,, on 116th day. Trypanosomes in blood ..	− ½	Positive.
34	8¼	2 4	20 m. 5 per cent. lith. ant. tart., intravenously 80 mg. ant., intravenously	3	,, on 81st day from pneumonia	− 1¼	Negative.
35	9½	2	80 ,, ,, ...	—	*Living* 347 *days after inoculation*	+ 1	
36	13	4	90 ,, ,, ...	1	Died on 88th day. Trypanosomes in blood ..	− ½	Positive
37	9	4	80 ,, ,, ...	—	,, on 67th day with nervous symptoms ..	− 1¼	Negative.
38	7	3	60 ,, ,, ...	2	,, on 40th day. Probably poisoned with ant.	− 1½	,,
39	9½	5	60 ,, ,, ...	2	,, on 76th ,, ,, ,, ,,	+ 1	Positive.

months in good condition, and was then killed. Inoculations from all the organs into rats proved negative, and the animal was regarded as cured; twelve others (Nos. 2, 5, 7, 9, 10, 11, 13, 14, 16, 17, 18, 19), which lived for from forty-eight to ninety-four days, if inoculation into rats from the organs after death can be accepted when negative as evidence of cure, may also be regarded as cured.

The preceding table shows in outline the results with thirteen other dogs since treated with antimony in the method indicated.

The last two dogs probably died from the effects of antimony, as other dogs at the same time died after the first dose of that particular sample.

Dogs are particularly susceptible to both surra and antimony, but if we accept negative sub-inoculations made from the organs after death as fair evidence of cure, this table and the previous one will work out as follows:—

In the first Dog Table (in the last Report), on this assumption, out of twenty-six dogs, thirteen may be regarded as cured, and in the one above, two are alive and seven gave negative results—that is, twenty-two out of thirty-nine altogether. The indications are also that treatment with the metal intravenously has yielded better results than that with the salts, either intravenously or intramuscularly.

The technique in dogs is difficult, as only the saphenous veins in the hind legs are available without an operation, and the suspension of the metal in salt solution must be as dilute as possible.

Intraperitoneal Injection of Antimony (Metal).—A series of experiments on the effects of intraperitoneal injections of the metal has been made on rats and rabbits. Both bear the metal quite well in the peritoneum, and neither pain nor inflammation was caused. The metal rapidly disappears from the peritoneum, and after three or four days none can be seen. In rats, one dose of 15 milligrammes will keep the trypanosomes out of the blood for an average of twenty-five days. No loss of weight or appetite occurred. In dogs this method is impracticable, as the injection causes acute peritonitis.

Rats treated with Arsenophenylglycin and Antimony.—In the last Report is an account of some experiments with arsenophenylglycin. A rat treated with one dose of arsenophenylglycin had a dose of lithium antimonyl tartrate given to it the day *before* recurrence took place in other rats treated with arsenophenylglycin. The rat lived 222 days without recurrence; and, regarded as cured,

it was reinoculated and treated intraperitoneally with one dose of antimony (metal): it died thirty-two days after, from a recurrence. Another rat treated with one dose of arsenophenylglycin and five doses of lithium antimony tartrate died of the disease; in this case the latter drug was not given until *after* recurrence took place.

These experiments show again that no protection is afforded by a previous attack, and also that the time at which treatment is begun is of importance.

New Arsenic and Antimony Compounds.—Five surra rats were treated with a new arsenic-camphor compound kindly sent to us for trial by Dr. Morgan, of the Imperial College of Science. They died at about the same time as untreated rats, and the substance was found to be too irritating for use.

Eleven surra rats were treated with a new organic antimony compound, also sent to us by Dr. Morgan. This caused considerable swelling, and did not effect the disappearance of the trypanosomes. The arsenic compound had no effect, the antimony a small effect. *In vitro*, the latter killed the organisms very slowly.

Treatment of Goats with Antimony.—According to Musgrave and Clegg,[1] inoculated surra in the goat is always fatal, and they give eighteen days as the time the untreated disease runs.

We have treated two goats with antimony. One has had three doses subcutaneously, each of about 80 milligrammes, of the metal suspended in egg-yolk and oil, and is living and well fifteen to sixteen months after inoculation. The other had fifteen doses of 20 *m.* of 5 per cent. lithium antimonyl tartrate, and later, when it became ill with nervous symptoms, four doses of 150 milligrammes of the metal intravenously. It became paralysed and died 236 days after inoculation.

Inoculations into rats from organs and cerebro-spinal fluid were negative.

Treatment of Surra Rabbits with Antimony.—The results of treatment of rabbits with antimony have been striking. They were left until they were very ill with the disease, with sores on the face, swollen genitals, œdema, eyes and nose inflamed, and unable to stand; after treatment all these symptoms disappeared, and their deaths were, we believe, due to poisoning with an impure antimony.

The table on p. 391 sets forth the principal points.

Inoculations made from Nos. 2, 3, and 4 into rats after death were negative.

[1] "Trypanosoma and Trypanosomiasis," 1903.

It will be noticed that after three doses of the salt there was a recurrence, and also after one dose of the metal, but not in those rabbits which had more than one dose of the metal.

No.	No. of doses	Material used, and quantity	Recurrences	Remarks
1	3	5 *m.* 5 per cent. lith. ant. tart. intravenously	1	Died on 116th day. Recurrence on the 115th day, when the impure metal was given.
	1	30 mg. ant., intravenously ..		
2	3	30 ,, ,, ..	—	Died on 80th day.
	1	30 ,, intraperitoneally		
3	2	60 ,, intravenously ..	—	Died on 183rd day, probably killed with impure antimony. Had increased 300 gr in weight.
4	2	30 ,, ,, ..	-	Died on 147th day, probably as No. 3. Had increased 180 gr. in weight.
5	1	30 ,, ,, ..	1	Died on 79th day. Lost 500 gr. in weight.

Experiments with Surra Rats after One Dose of Antimony.— We have had the following curious experience with infected rats which have been treated with *one* dose of lithium antimonyl tartrate. One dose of this drug causes the disappearance of all trypanosomes from the blood, and keeps the blood free from them for a variable period, the average time of recurrence being eighteen days. We wished to find out how soon the blood of a rat thus treated became infective to other rats on sub-inoculation, and whether it would prove to be so before trypanosomes could be found in it by ordinary microscopic examination. Sub-inoculations were therefore made from the treated rat's blood at various intervals from the second to the sixteenth day after one dose of antimony. It was then found that the blood of the original rat was infective long before any trypanosomes could be found in the peripheral circulation; but also that this infectivity was not constant, an infection being produced on one day, and none occurring on one or two subsequent days. Moreover, as the table shows, the course of the disease (incubation period especially) was very prolonged. Ordinary untreated infective blood produces in rats a recognisable infection in from two to four days, and death in from six to seven days. In these cases either the trypanosomes could not be found in the peripheral blood at all, the only lesion being the very large spleen, or were not found until the twenty-eighth day after inoculation. These prolonged incubation periods appeared to have no relation to the time of the recurrence in the original rat, and the infection was brought about by blood which not only showed no trypanosomes, but appeared to be perfectly normal in structure. We have no explanation of these results, but as all the rats which died had very large spleens we can

only suppose that the trypanosomes were present in either some form or place which we did not recognise or find. If this be so the experiments are of interest as showing the influence on the trypanosomes, and the constant effects, of one dose of antimony.

TABLE GIVING DETAILS OF THE ABOVE-MENTIONED EXPERIMENTS.

Rats inoculated from treated Rat 1 on—	Death occurred on—	Spleen	Trypanosomes present (+) or absent (0), from blood	Remarks
5th day after dose..	—	—	—	Living 103 days
7th ,, ,, ..	31st day	Very large	0	—
10th ,, ,, ..	16th day	Large	0	—
12th ,, ,, ..	—	—	—	Living 95 days
14th ,, ,, ..	18th day	Very large	0	—
Ditto from Rat 2 on—				
2nd day after dose..	—	—	—	Living 52 days
4th ,, ,, ..	—	—	—	Living 50 days
7th ,, ,, ..	—	—	—	Living 47 days
10th ,, ,, ..	28th day	Very large	+ +	—
16th ,, ,, ..	41st day	Enormous	0 in blood, spleen, liver, adrenals	—

It will be noticed that death was delayed up to as long as forty-one days. Two other rats were given a relatively smaller dose of antimony, and rats inoculated from these on the 4th, 7th, 9th, and 11th days after the dose died with trypanosomes in their blood on the 24th, 19th, 19th, and 29th days respectively, the incubation period only being much prolonged.

Experiments upon Surra Horses with Antimony.—Inoculated surra in horses runs a quicker course than that acquired naturally, and it is difficult to give a certain time for the disease, as a good deal depends on the condition of the horse, and experimental horses are usually old and worn-out and would succumb more quickly than young ones. Cases of untreated experimental surra in horses have died as early as the 14th day, but the time probably depends very much upon the age and condition of the animal. The horses we have used were inoculated from rats, and the incubation period was practically six days. Musgrave and Clegg[1] give six to thirteen days as the incubation period, so that our strain of surra is a fairly virulent one for horses.

Both intramuscular and intravenous injection of antimony (metal) have been tried. Doses of 2 grammes have been given intravenously, and if sufficiently diluted with warm salt solution no unpleasant symptoms follow. Large doses are best borne when injected into a peripheral vein in one of the legs, and one injection

[1] *Op. cit.*

of 1 gramme will keep the blood free from trypanosomes for from two to three weeks. If the injection be made into the jugular vein considerable depression, and even faintness, may be induced. The use of a peripheral vein involves throwing the horse, which is risky if repeated doses have to be given. We have not yet ascertained the maximum dose. All the horses died with nervous symptoms, and although life has been prolonged (in one case to 121 days) none of them has shown satisfactory results. We have persisted in our experiments with metallic antimony because we hoped that, as it is taken up by the leucocytes, it might possibly be carried by them to, and be deposited in, parts not accessible otherwise; also, because we know that in syphilis the protozoon causing the disease is killed by the injection of metallic mercury. We know also that syphilis requires a continued treatment, and it may be that in trypanosomiasis a continued treatment also is necessary. The effects produced by metallic antimony are so striking that we are emboldened to think that if the methods could be improved a much better effect would be obtained.

The following table summarises the experiments upon horses :—

No.	No. of doses	Material and quantity given	Recurrences	Remarks
		Intramuscular—		
1	7	20 per cent. suspension of sod. ant. tart. in Lambkin's medium. Doses from 1 to 20 cc.; in all 36 cc.	—	No trypanosomes seen for 17 days before death. Died on 44th day with nervous symptoms and thoracic œdema. Spleen normal.
	1	5 cc. 5 per cent. ant. in Lambkin's medium		
		Intravenous—		
2	8	Ant. in salt solution. Doses from 0·5 gr. to 1·25 gr., altogether 5·5 gr.	2	No trypanosomes seen for 19 days before death. Died on 52nd day with nervous symptoms
3	8	Ant. in salt solution. Doses from 0·1 gr. to 2 gr., altogether 9·75 gr.	3	No trypanosomes seen for 20 days before death. Died on 121st day with nervous symptoms
4	6	Ant. in salt solution. Doses from 0·1 gr. to 2 gr., altogether 4·5 gr.	—	No trypanosomes seen after first dose. Died on 56th day with nervous symptoms. Had persistent thoracic œdema.

With the exception of No. 1, these horses were old and worn-out.

It will be noticed that none of these horses had trypanosomes in the blood for some time before death; No. 3 appeared to be quite well up to the 90th day, and No. 4 up to the 40th day, and both could apparently have worked up to these times. In all cases death was preceded by a very sudden aggravation of symptoms referable to the nervous system.

We considered that treatment by injection into the cerebro-spinal space was impracticable in horses owing to the distance of the spinal canal from the surface, and to the fact that the spinal cord extends much further down the canal than in man.

Experiments with Silver Salts.—Three surra rats were treated with protargol in doses varying from 0·5 cc. of a 1 per cent. solution to 1 cc. of a 2 per cent. solution.

Three surra rats were treated with argyrol in similar doses.

Three surra rats were treated with silver nitrate in doses varying from 1 cc. of a 0·02 per cent. solution to 1 cc. of a 1 per cent. solution.

All these rats died at the usual time: death was not delayed, nor were the trypanosomes reduced in number in the blood. *Post-mortem* examination showed that they had died with the usual signs of acute trypanosomiasis, with very large spleens, &c. At the sites of injection of protargol there was œdema and brown staining of the tissues in a circumscribed area: there was more marked œdema and swelling after injection of argyrol, and œdema and localised necrosis of the tissues after injection of silver nitrate. It would appear that the silver salts are not absorbed from the site of injection. Presumably they have a primary cauterising action on the tissues, and are quickly transformed into silver chloride, which is inert.

In vitro experiments were carried out with these three compounds, all of which are soluble in distilled water. Equal sized drops of blood containing trypanosomes and of the solutions were mixed, and the results observed under the microscope.

Protargol solutions from 1 in 200 to 1 in 10,000 produced very little effect; in 1 in 200 dead trypanosomes were seen in thirty minutes, but many were alive in twenty-four hours. Silver nitrate in solutions from 1 in 200 to 1 in 10,000 has much the same effect as protargol.

Some trpyanosomes are killed in thirty minutes by the stronger solutions, but the remainder are as active as the controls up to twenty-four hours and longer.

Argyrol (which contains 30 per cent. silver) in solutions of 1 in 1,000 to 1 in 10,000. The stronger solutions are still less active than those of protargol and silver nitrate; and the more dilute have no effect up to three hours. Thus it appears that these bodies have no effect except the early effects of the stronger solutions; they probably combine with the salts in the blood plasma and corpuscles, and become inert.

Citrate of silver in its strongest solution of 1 in 4,000 is also inert.

"CONVOYS OF EVACUATION."

By Major W. E. HUDLESTON.
Royal Army Medical Corps.

The term Convoys of Evacuation is employed in this article in the same sense as it is used in Chapter V. of the "Geneva Convention" of 1906.

They have played a most important part in all military campaigns, whether between civilised belligerents or against a savage foe. This fact was evidently realised when the Articles of the "Geneva Convention" of 1906 were drawn up.

"Convoys of Evacuation" are specially alluded to in "Field Service Regulations," part II., section 78, paras. 7 and 8.

Colonel W. G. Macpherson, in his lecture on "Removal of Sick and Wounded from the Battlefield," makes the following allusions to them :—

On page 15 : "The use of general service wagons returning empty."

"It is on this that our present field medical organisation depends."

And again on page 17 : "The use of special units for removal of sick and wounded."

"Very frequently the collection and preparation of suitable transport material, the organisation of local transport resources in *personnel*, &c., the improvisation of all kinds and means of transport, and the formation of rest or refreshment stations along the route, are duties that will occupy the whole time and energies of a special organising and executive body of the medical service."

Lieutenant-Colonel M. W. Russell, in his article on "The *Rôle* of the Clearing Hospital," also alludes to them as follows :—

Speaking of the officer commanding the clearing hospital : "He should at once organise a convoy section from his *personnel*" ; and again, "He should, without delay, arrange for the study of the best methods of adapting local or other transport to medical needs, and should set about collecting the necessary material and instructing his men in its use."

Let us now examine certain factors which relate to the organisation and working of "convoys of evacuation."

The Extent of the Evacuating Zone.—This cannot be measured in miles, or days' marches, for the obvious reason that it is continually varying. However, as the paramount duty of the clearing

hospital is to relieve the field ambulances of their sick and wounded as soon as possible, and as the wagons of a field ambulance, when sent back with sick and wounded, must always be able to rejoin their own unit on the same day, it follows, therefore, that the clearing hospital must be within at least half a day's march of the rearmost field ambulance. This then will be the point from which our convoys of evacuation will start, and the end of their journey will be either at railhead or possibly at an advanced depot to which a stationary hospital has been sent. It may fairly be conceded that this will very frequently entail a journey of two or three days for our convoys of evacuation before they reach the stationary hospital or railhead. The organisation of these convoys will fall chiefly on the officer commanding the clearing hospital and his subordinates.

The Organisation of a Convoy of Evacuation entails :—

(1) The collection of the vehicles, horses and harness, and the impressment of drivers.

(2) The adaptation of all and sundry vehicles to the requirements of carriage for sick and wounded.

(3) The maintenance of vehicles and harness in serviceable condition.

(4) Arrangements for feeding *personnel* (both civil and military) and horses, to say nothing of the grooming of the latter, fitting harness, &c.

(5) The detailing of medical *personnel.*

(6) Arrangements for the provision of potable water for the sick, wounded, and *personnel.* The smallest convoy would require one water-cart.

(NOTE.—No water-cart is provided in the equipment of a clearing hospital.)

(7) The issue of medical and surgical equipment—viz., medical comforts, cooking utensils, ordnance stores, including lanterns, blankets, waterproof sheets, bedpans, in fact all the impedimenta for the care of the sick.

(NOTE.—With regard to paras. 5 and 7, the officer commanding the clearing hospital may hope to see his *personnel* and equipment back in four to six days, always granted that his unit has remained stationary during that period.)

The Use of Empty Wagons of Supply Columns and Parks.—This method of evacuating Clearing Hospitals will not stand analysis,

"Field Service Regulations," part II, section 42, para. 2,

informs us that supply columns will fill up with supplies purchased or requisitioned locally, and the same Regulations, section 43, para. 2, say that supply parks "extend the radius of action of the supply columns, enabling local resources to be exploited over a wider area of country, or a greater distance to be maintained from the Line of Communication."

It is obvious, therefore, that empty wagons of supply columns and parks will seldom be returning to replenish from the Line of Communication.

To place any dependence on this means of evacuating a clearing hospital is therefore impossible.

Further, the general service wagon is not at all suitable for lying-down cases, its floor is too narrow to accommodate two stretchers.

Lying-down cases must therefore be placed on the floor of the wagon on a bed of straw or hay. The process of loading and unloading such cases will be slow, and difficult and fraught with much pain and risk to the patient.

The Adaptation of Civil Vehicles for the Carriage of Wounded.—This resolves itself into adaptation for lying-down cases. Those vehicles which are easily adaptable for this purpose are usually open to the grave objection of exposing the patient. The ordinary closed vehicles of civil life are incapable of adaptation short of almost complete reconstruction. Some omnibuses and the ordinary furniture van may be exceptions. It would appear, therefore, that to arrange for the carriage of lying-down cases will be a very difficult problem under the present conditions.

The Geneva Convention, Chapter V., Art 17.—This has much bearing on the working of "Convoys of Evacuation." The final paragraph must especially be borne in mind :—

"The civilian *personnel*, and the various means of transport obtained by requisition, including railway material and boats used for convoys, shall be subject to the general rules of international law."

The *personnel* of a clearing hospital will be found in section 2, F., page 19, of the "Field Service Manual, Army Medical Service," and a list of its tentage, equipment, &c., will be found at the end of this article.

The *rôle* of the clearing hospital is to be found in "Field Service Regulations," part II., section 78, and in the lecture and article above quoted.

Apart from the organisation and working of the convoys of evacuation, the duties are arduous enough. The only parts of the

convoy of evacuation not liable to confiscation when captured by the enemy are the military escort, the medical *personnel* and medical equipment and ambulance wagons (if any). Therefore on capture, our convoy, as far as the transport for the sick and wounded is concerned, ceases to exist.

The remedy lies in one of two ways :—

(1) To give the clearing hospital transport capable of conversion into ambulance transport, as in the Canadian field hospital in South Africa. (Even with this, after despatching a large convoy, the clearing hospital becomes temporarily immobile.)

(2) To organise, in time of peace, a sick and wounded transport unit, as in the Japanese army. (This is the ideal method, for obvious reasons, and particularly because as a "mobile medical unit" it would not be liable to confiscation when captured.)

The detail of *personnel* and transport of such an unit is shown in tabular form at the end of this article, under the name of "convoy division."

The transport has been so arranged as to make the unit capable of accommodating 200 sick :—

20 per cent. lying down = 40 patients = 10 ambulance wagons.
80 ,, sitting up = 160 patients = 14* ,, ,,

(* *Note.*—Thirteen wagons with twelve each, and one wagon with four patients.)

An innovation will be noticed in the table of transport, in that ten ambulance wagons have only two horses each. These wagons are to be utilised for the lying-down cases, and it is assumed that if four horses are sufficient for an ambulance wagon with twelve patients, then two horses will be sufficient for one with four patients, especially as the ambulance wagons will not be worked at high pressure on any sort of roads, as in the case of the field ambulances. The roads will be comparatively good and the pace a steady 2½ miles an hour, with regular halts for rest and food.

Special *personnel* for "water duties" will be noted in the detail.

Two artificer wheelers and a saddler will be required to mend the civil transport and harness which may be requisitioned.

It is not suggested for one moment that the provision of one medical convoy unit for 200 sick per division will suffice for all requirements. It is maintained that the officer commanding the clearing hospital will not have time to collect and organise a convoy from civil sources; that his *personnel* and equipment are not sufficient if the requirements for convoys are imposed upon him; that such a convoy unit would be capable of considerable expansion by

requisition from civil sources; that it would provide for the proper carriage of lying-down cases (all its ambulance wagons might be used if required for lying-down cases, leaving civil vehicles for cases able to sit, for which purpose no adaptation would be required); that such an unit would be entitled to respect and protection by the belligerents, Chapter II., Art. 6, "Geneva Convention," 1906.

If it be granted then that the clearing hospital, as at present organised, is unable to satisfy the requirements for its own evacuation, it is pertinent to examine its capabilities for the performance of its other functions. These functions have been most clearly defined in the article by Lieutenant-Colonel M. W. Russell above referred to, and require no further recapitulation.

I think it may fairly be admitted that absence of transport and ambulance wagons renders the clearing hospital incapable of performing the functions allotted to this unit.

Again we must seek a remedy, and the remedy suggested is to form an unit called a

Clearing Ambulance.

This will consist of a receiving division and a convoy division.

While on the subject of the name of this unit, which is to replace the clearing hospital, I would like to submit that the name "hospital," for the present unit is misleading. When a sick or wounded man hears that his next destination is dignified by the name of "hospital," he is naturally apt to anticipate some of the comforts associated with the term, such comforts especially as a bed to lie upon, regular meals, and some respite, if only for two or three days, from transport from place to place, &c. In the present clearing hospital he will be grievously disillusioned, and for this reason alone I think it is advisable to avoid the misnomer "hospital."

To return to the organisation of our "clearing ambulance." I have endeavoured to tabulate the requirements of the "convoy division" of our "clearing ambulance" as far as *personnel* and transport are concerned. To what extent will the present equipment of a clearing hospital (see "Field Service Manual, Army Medical Service") meet the requirements of the "receiving division"? We see under the heading "tentage," thirty-four marquees, each weighing 512 lb.; these, I think, are hardly suitable for a so-called mobile unit, as a clearing hospital is supposed to be, they would certainly be omitted from the proposed unit under discussion. The twenty single bell tents will also be omitted. Buildings must be utilised

and will nearly always be available within reasonable distance in a civilised country.

Equipment.—Hospital panniers Nos. 1 to 4 might remain, No. 5 should be omitted; medical and surgical equipment, and medical comfort panniers should be doubled; stationery boxes and ordnance stores might remain the same; clothing and necessaries should be omitted, except the following: ankle boots (for Royal Army Medical Corps), razors, and greatcoats.

The changes above suggested would reduce the weight of the new unit to about 40,000 lb., and it would therefore require between thirteen and fourteen general service wagons for its transport as a whole.

This number of general service wagons could still further be reduced by utilising the ambulance wagons when the unit is advancing empty, to relieve the field ambulances.

The detail of transport for the "receiving division" has been omitted, as the carrying capacity of an ambulance wagon for equipment is unknown; and the extent to which these wagons should be utilised for carrying equipment must vary with the necessity for their use for sick and wounded.

It is submitted in conclusion that a "clearing ambulance," organised as suggested, would satisfy the need of the first unit in the Evacuating Zone.

CLEARING AMBULANCE (War Establishment).

Receiving Division.

Personnel.

	Detail	Officers	W. Officers	S.-Serjts. and Serjts.	Buglers	Rank and file	Total	Riding horses
	Lieut.-Col.	1	—	—	—	—	1	1
	Major	1		—	—	—	1	1
	Capt. or Lieut.	2		—	—		2	2
	Warrant Officer	—	1	—	—	—	1	
	Nursing	—	—	1	—	—	1	—
Serjts.	Steward	—	—	1	—	—	1	
	Compounder	—		1	—	—	1	—
	Pack Store	—	—	1	—		1	—
	Clerk	—	—	1	—	—	1	
	General duty	—	—	1	—		1	—
	Bugler		—	—	1	—	1	—
Corpls.	General duties		—	—	—	4	4	—
Privates	Stewards	—	—	—	—	1	1	
	Cooks		—	—	—	2	2	
	Pack stores	—	—	—	—	1	1	—
	Nursing		—	—	—	7	7	—
	General duty			—	—	20	20	—
	Bâtmen		—	—	—	4	4	—
	Total, R.A.M.C.	4	1	6	1	39	51	—

	Detail	Officers	W. Officers	S.-Serjts. and Serjts.	Buglers	Rank and file	Total	Riding horses
	Convoy Division.							
	Major	1	—	—	—	—	1	1
	Capt. or Lieut.	2	—	—	—	—	2	2
	Warrant Officer	—	1	—	—	—	1	—
Serjts.	Nursing	—	—	2	—	—	2	—
	Cook	—	—	1	—	—	1	—
	Pack Store	—	—	1	—	—	1	—
	General duty	—	—	2*	—	—	2	—
	Bugler	—	—	—	1	—	1	
Crpls.	Clerk	—	—	—	—	1	1	—
	General duty	—	—	—	—	1	1	—
	Cook	—	—	—	—	2	2	—
Privates	Pack store	—	—	—	—	1	1	—
	Nursing	—	—	—	—	10	10†	—
	General duty	—	—	—	—	18*	18	—
	Total, R.A.M.C.	3	1	6	1	33	44	3
	Attached transport.							
	Details, A.S.C.							
	Serjts.	—	—	3	—	—	3	3
	Wheelers	—	—	—	—	2	2	—
	Vehicles	—	—	—	—	45	45	—
Drivers	Spare horses	—	—	—	—	1	1	—
	Spare	—	—	—	—	2	2	—
	Batmen	—	—	—	—	3	3	—
	Total, Convoy Division	3	1	9	1	86	100	6

* One Serjeant and four Privates for water duty.
† For serious cases.

TRANSPORT FOR "CONVOY DIVISION."

Detail		Vehicles	Drivers, A.S.C.	Draught horses
Carts	Water	2	2	4
	Forage	2	2	4
Wagons	G.S. (Med. station)	2	4	8
	G.S. (baggage)	2	4	8
	Ambulance (2 horse)	10	10	20
	,, (4 horse)	14	28	56
Drivers	Spare horse	—	2	4
	Spare	—	2	—
	Total	32	54	104

CLEARING HOSPITAL.

The detail of personnel is shown in Sect. II., F., p. 9, of the "Field Service Manual, Army Medical Service."

Clearing Hospital, Equipment, &c.

Tentage .. Thirty-four marquees, twenty single bell tents.
(Weight of marquee, 492 lb. (512); weight of bell tent, 83 lb.)

Camp Space .. 204 by 190 yards.

Equipment .. *Hospital Panniers.* (Appendix 24, *Field Service Manual*) :—

No. 1 pannier, containing ward stores	No. 8.
,, 2 ,, ,, stores for Sisters' or N.C.O.'s duty tent	,, 2.
,, 3 ,, ,, dispensary stores	,, 2.
,, 4 ,, ,, kitchen stores	,, 2.
,, 5 ,, ,, laundry stores	,, 2

Medical and Surgical. (Appendix 4, *Field Service Manual*) :—

Medical companion and water bottle	No. 4.
Surgical haversack and water bottle	,, 8.
Field medical panniers	Pairs 2.
Reserve field medical panniers	,, 2.
Field surgical panniers	,, 2.
Field fracture boxes	No. 2.
Antiseptic cases or reserve dressing boxes	,, 10.

REPORT ON THE PRESENT CONDITION OF ISMAILIA AS REGARDS MALARIAL FEVER.

By Colonel Sir DAVID BRUCE, C.B., F.R.S.

On returning from Uganda *via* the Nile in February, 1910, I visited Ismailia to inspect the work of malaria prevention which has been in progress in that town since 1902. On arriving at Cairo from Khartoum, arrangements were made to proceed to Ismailia on February 18th, 1910, every assistance and facility being given by the Suez Canal Company for that purpose. Ismailia station was reached on the date mentioned at 2 p.m., Prince d'Arenberg, the President of the Company, several of the Directors, including MM. Sharme, Tillier and Doyen, and others, being present.

During the afternoon an inspection of the town and its environs was made under the guidance of Dr. Cambiouliu, and embarking with him in a motor launch across Lake Timsah to a hill situated about a mile to the west of the town, we reached the new reservoir for the filtered water; from here a good view of Ismailia, its suburbs, and Lake Timsah, could be obtained. The township is located on the northern edge of this lake, through which the Suez Canal passes. It is one of the Bitter Lakes which existed in the Isthmus of Suez before the Maritime Canal was cut, and it formerly contained much salt until the sea-water of the Mediterranean and the Red Sea was run into it, and the Suez Canal dredged through it. Viewed from the hill, the lake appeared circular, about five miles in diameter, and bordered by desert on all sides, except for the town itself, which is richly planted with gardens and trees, and is immediately surrounded by much cultivation. The town is in an oasis standing on the shore of the lake, and then beyond again is desert so far as the eye could reach.

Ismailia is a town of villas built among gardens. To the west there is a native location containing many huts built on the edge of the desert. Further to the westward again the Sweet Water Canal can be seen winding its way from the direction of Cairo, 100 miles distant. As this canal, which conveys fresh water from the Nile to Ismailia, Port Said and Suez, nears Lake Timsah it breaks up into several branches, which form a small delta as they discharge into the sea-water of the lake. One of these branches can be seen passing to the southward towards Suez, another running north to Port Said, while a third passes through the town of Ismailia itself,

and ultimately flows into Lake Timsah to the east of the European quarters. This Sweet Water Canal was the cause of the fever which decimated the place for twenty years after the opening of the Suez Canal itself. From the hill could be seen the delta of this Fresh Water Canal, passing in several streams round its base, and to be noted were the trees and vegetation wherever the water escaped into the surrounding desert. Before the anti-malarial campaign was instituted, this water, which is laden with a rich silt from the Nile, formed pools and puddles, and even shallow marshes around all of its ramifications, and in and near the town of Ismailia itself; it was in these that the *Anopheline* mosquitoes used to breed. Now the puddles have all been filled up, and the banks of this canal strengthened, so as to prevent oozing through its walls leading to the formation of puddles, &c. The shallow marshes have been drained or filled up, and in the town a system of irrigation instituted, so that no stagnant water is allowed to remain for a period long enough to allow mosquitoes to breed.

With a view of inspecting this system of irrigation more closely a descent of the hill was made to return to the pier at Ismailia, crossing the lake again in the boat. The Sweet Water Canal as it passes through Ismailia is about twenty metres broad and two deep. It has a very sluggish stream, and the water is muddy as it is in the Nile. It is full of fish, which keep the canal itself free from mosquito larvæ. This canal was originally a small irrigation stream which served the native villages between Ismailia and the towns nearer Cairo. After the Suez Canal construction had begun this stream was deepened so as to obtain more water for the workmen employed. After the Araby Pasha Rebellion in 1882, it was again deepened to allow the passage of shallow-draught boats between Cairo and the Suez Canal; they were to carry cargo to and from the ships. The result was that much water infiltrated through the banks of the recently dredged stream, and the surrounding desert being wholly sandy and free from impermeable strata, it appeared in the hollows of the neighbourhood, forming the marshes which gave rise to the fever. It was at first intended to make Ismailia the chief port of the Suez Canal, but the appearance of malaria frustrated the intention, for almost everyone in the town was attacked, and nearly 2,000 cases occurred annually; Port Said has since taken its place as the principal port of the Suez Canal. The level of the water in Fresh Water Canal is higher than that of Lake Timsah, and it contains two locks as it passes through the town. This allows boats to be raised up to the necessary height

for towing to Cairo, and prevents sea-water finding its way into the canal from the lake. The gardens are situated below the level of the water in this canal, and they are irrigated from it. The Nile water is permitted to flow down into them through sluices. Then a series of irrigation channels or runnels feeds all parts of the town and the neighbouring cultivations. At each bend of these irrigation channels a syphon is interposed, so that the flow of the water can be regulated or even stopped if necessary. The keys of the various sluices are kept by the engineers of the Suez Canal Company, who allow water to flow through each gate for a certain number of days only in each week. During that time the gardens and cultivations are thoroughly irrigated. Then the sluice gates are closed and the water in the runnels beyond is allowed to dry. In this way the formation of puddles containing stagnant water is prevented for more than two or three days at a time. Mosquitoes require at least twelve days for their larval metamorphoses, and they must remain in water during this period. But at Ismailia, under this system of irrigation, no water is stagnant for more than three days at a time, and in consequence the mosquito larvæ cannot reach maturity before the water dries up, and they are killed in the drying.

The Public Gardens were then visited under the guidance of Dr. Cambiouliu, and the sites of the filled-up marshes noted. One large marsh to the east of the town has been levelled up and converted into the park called the Bois de Boulogne. The golf links now cover a large swamp which was formerly the cause of much malaria. Through these filled-in marshes the water runs in shallow streams, in which its course is controlled by syphons and sluice gates. The channels themselves, when they permanently contain water, are stocked with fish. To the west of the town the same thing has been done. Here below and beyond the native quarter the cultivations are irrigated in the same way as in the gardens. The natives are not allowed to harbour stagnant water for more than two or three days on their allotments. Further to the south-west, in the delta of the Sweet Water Canal, there still exist some undrained swamps, and *Anophelines* may still be found there during the summer and autumn months. This has necessitated the undertaking of drainage for these distant marshes also, as when the wind veers to the south-west in the early autumn, an occasional mosquito finds its way into the town. They are never in sufficient numbers to do any harm, for south-west winds are not common, and no malaria exists to infect the mosquitoes,

but as it is imperative to absolutely prevent any danger of malaria reappearing this expensive work has been undertaken. These swamps are being treated as the others, namely, by filling in and reclaiming, and by controlling the passage of the water through them. The object aimed at, being, as at Ismailia itself, to prevent stagnant water.

In the town itself there is a population of ten thousand, and it is well laid out with broad streets and avenues. The villas of the employees of the Company are well built, with open verandahs and good gardens. With the exception of the new residence of Prince d'Arenberg, the houses are of two stories generally. But as the Company owns or has control over all the land around Ismailia measures are being taken to regulate buildings. In the native quarter the small huts are placed more closely together. Each house or hut has a cesspool in which *Culecine* mosquitoes were in the habit of breeding. These have now been dealt with by oiling weekly with petroleum. For this purpose, a gang of men under a European foreman visits every house and hut once a week, when the cesspools are oiled, dirty water emptied, mosquito larvæ searched for, and insanitary conditions dealt with when found. This mosquito brigade has now been working regularly since 1902, and with great success; mosquito nets are dispensed with at the Residence, which is in the centre of the town. In the European quarter a drain has been recently laid down to receive the overflow water from the cesspools, and it discharges into the lake below the town; but the work and weekly visit of the brigade continues as before. This costs annually about £400, of which half is spent in oil and half on the men's salaries, The brigade, which was seen at work, consists of three natives and a Greek foreman. They have a barrel on wheels containing about 40 gallons of mixed crude and refined petroleum. This is taken from house to house, the whole town being mapped out into six areas corresponding to the days of the week. One man enters each house, and having oiled the cesspool, he examines the compound for stagnant water, such as buckets, broken bottles, tins, &c., and then asking if there are any mosquitoes in the house, he proceeds to the next villa or hut appointed to him. Some footmarks made by camels near the Sweet Water Canal bank which had formed puddles were noted; these had been recently oiled. Some holes made by stakes driven into the ground by natives to mark an allotment had also been recently oiled. These observations serve to show that the work must continue perpetually and persever-

ingly or mosquitoes will return. There are many fountains at Ismailia. Some of them have been allowed to dry up; some are now stocked with gold fish; the remainder are emptied completely every week.

The result of these measures has been the abolition of all species of mosquitoes from Ismailia. It was learned that the President of the Company, with some of his Directors, reside there for several weeks every year, and that they are never worried by mosquitoes and that fever is unknown. The work must always be continued, however, and it costs annually, including the permanent drainage of the marshes, about £1,000. This represents an annual tax of less than two francs per head per year, which the Company gladly pays, regarding it as a great economy over the expenses which were caused to them by malaria. Information was forthcoming to show that all the inhabitants of the town used to be afflicted; men could not work, families were always ill, and children died. Facilities to witness the change that has now taken place were given by attending a discourse given by M. Tillier on his travels in Central Africa. It took place at the Club before a crowded audience consisting of officials and employees of the Company. They did not look ill; on the contrary they looked very well.

The last visit was to the hospital. It is placed on a hill overlooking the Suez Canal, about a mile to the east of Ismailia. It is divided into two buildings, one for Europeans and one for natives. Dr. Cambiouliu exhibited the malaria returns since the year 1877. In the hospital there were treated 300 cases of tertian and malignant malaria that year. During 1885, after the deepening of the Fresh Water Canal, the number rose to 2,000, and the annual incidence continued, with an average of 1,800, until the measures against mosquitoes were instituted by the advice of Major Ronald Ross, in the year 1902; then the result was almost immediate, for in the following year only 214 cases occurred. In 1904, there were only 90 cases; in 1905, 37 cases; and in 1906, the town was free from the disease, and has continued free ever since. In 1902 the taking of quinine was made compulsory among the employees and workmen of the Company, and a dispensary was opened in the town where it could be obtained gratis. This was continued for three years, but now the necessity for it has disappeared. At the present time very little quinine is distributed, except to the villagers who live miles above the town on the banks of the Sweet Water Canal. But in Ismailia itself the demand for quinine is very small, and there is no need now for its compulsory

distribution. In the fever days, the dispensary dealt with large numbers of malaria cases, but records of these are not very trustworthy, as only the admissions to hospital and the cases treated in the wards had the diagnosis confirmed by blood examinations. That there were many deaths due to malaria is beyond question, but death-registration in Egypt is carried out very imperfectly and is left largely to natives. Many persons die apparently without certification or examination before death, so that death-rate returns in Egypt are not trustworthy. But it appears that almost everyone at Ismailia was infected with malaria, and work was at one time at a standstill. Now the doctors treat an occasional case of typhoid or Malta fever (there are several infected goats at Port Said), but malaria has been abolished.

One fact, however, impressed itself. The Suez Canal Company is all-powerful at Ismailia. The inhabitants, with the exception of a few natives and minor Government officials, are employees of the Company and are paid by it. Therefore, any regulations made by the Directors can readily be enforced. The disabilities of the Capitulations under which the remainder of Egypt suffers do not affect Ismailia. There is absolute authority. Then the Company is a rich one ; it has the necessary funds. With these two factors almost any sanitary reform may be carried out. And with them malaria has been exterminated at Ismailia. Nature has assisted these factors by supplying a rainless climate. The town being isolated in the desert has been easier to free from mosquitoes than many others would be, for surrounding irrigation and cultivation would have rendered the task a greater one. One can well understand tropical rains making malaria prevention a more expensive matter, for the drainage would then have to be more extensive, and the work of the mosquito brigade much increased. However, the fact remains that the work done at Ismailia has been thorough and malaria has been abolished.

THE DEFINITION OF A UNIT'S PROTECTION BY ANTI-TYPHOID INOCULATION.

By Colonel T. M. CORKER.

The state of protection of an individual or of a regiment is very difficult to define, as not only does the susceptibility of individuals vary greatly, but the period of protection afforded by inoculation, or even by an attack of enteric fever, cannot be stated with certainty. But, on the other hand, to say that a regiment has 600 inoculated men, regardless of the dates of the inoculations, is not scientific, and although we are not able to define the period of protection mathematically, we nevertheless are not justified in resting content with loose data. We have certain ideas of the approximate time that protection lasts in the majority of the inoculated, and these ideas may be taken as a temporary basis on which to formulate an estimate of protection. To say for instance that 600 men, inoculated six years ago, are as well protected to-day as 600 inoculated six months ago, is incorrect, and if the question arose on active service as to which 600 should be chosen to occupy a dangerously-infected post, the answer would not be doubtful. Evidently then it is desirable to define protection more definitely, and the matter was taken under consideration in Egypt

The difficult point to settle was the period of protection. It was decided to accept, at any rate as a temporary basis, the general idea that two years might be regarded as an approximate estimate, and instructions were issued to make a gradual analysis of the medical history sheets of the inoculated men in Egypt. The officers concerned readily undertook the extra labour as they appreciated the logical intention, and I will add the results before closing this paper. It is evident that an examination of this kind need not be carried out again, as all succeeding work has merely to be added in. Still it was further directed, that on the red ticket on each medical history sheet should be added the words "Protected to such and such a date."

Accepting then two years as the period of protection, it became further necessary to define certain general dates up to which to calculate, as it would be impracticable to give each man a separate date, and as spring and autumn are generally the times of movement of troops, these seasons were chosen, and it was further added that when it was doubtful as to whether to show a man as protected to spring or autumn, his two-year period of protection falling somewhere between the two, the lesser period should be adopted. Presuming then that all the men inoculated

during past years are still in the station we got the following result in one unit :—

Protected to autumn, 1910..	578
,, spring, 1911.	356
(*i.e.*, 356 remaining from the 578 above.)	
,, autumn, 1911..	189
(*i.e.*, 189 remaining from the 356 above.)	
,, spring, 1912..	150
(*i.e.*, 150 remaining from the 189 above.)	
,, autumn, 1912..	*Nil*

In other words the present protection of 578 men will gradually work off as groups of men reach their two-year limit.

We have next to bear in mind the continual changes in this estimate that will result from fresh inoculations, and from the alterations in the *personnel* of a regiment abroad by drafts from home (some of whom have been inoculated), transfers to the reserve and other casualties. Whether all officers who return the inoculations of their regiment have hitherto kept a profit and loss account of this kind, I do not know. But it is evident that they should, and all that is needed is to devise a suitable statistical table, and to keep it continually under review. All fresh inoculations should be entered four times, once for each of the half-yearly periods included in the two-year protection. The medical history sheets of a draft should be examined in detail, as was done with each unit, the protection of each man estimated, and an entry made as shown below. The table now formulated seems to meet the requirements. A large number of unfilled columns should be kept ready for future entries, and the grand total column must be kept in pencil. All additions and subtractions will be made along the horizontal lines.

		Subsequent Losses		Subsequent Gains				
Analysis made 1910. Men found protected to		To res. Oct., 1910	Died and invalided, May to Oct., 1910	Inoc. July 22	Draft from home	Inoc. Nov., 1910	Inoc. May, 1911 (say)	Grand totals. To be kept in pencil showing the protection at any period
Autumn, 1910	578	30	8	50	32	—	—	622
Spring, 1911	356	30	8	50	22	44	—	434
Autumn, 1911	189	30	8	50	10	44	210	465
Spring, 1912	150	30	8	50	1	44	210	417
Autumn, 1912		—	—	—	—	44	210	254
Spring, 1913		—	—	—	—	—	210	210

A little further explanation will perhaps be useful. The first column represents the result of analysing the medical history sheets —578 are at this moment protected, but the protection of 222 of these will run off by next spring. The top number in this column always includes those below. The thirty men go to the reserve in October. Evidently these must be deducted *from each figure that originally included them.* Similarly with the eight who died and

were invalided. Fifty are recorded as fresh inoculations. These fifty will be on the profit side up to two years from the present date, that is, must be added to *each* horizontal line. A draft from home comprised thirty-two inoculated, but an examination of the medical history sheets showed that only twenty-two of these would be still protected next spring and only ten next autumn. They are entered accordingly. In November, 1910, and May, 1911, fresh inoculations are made. Their protection runs on to autumn, 1912, and spring, 1913. The grand total really protected on any given date will continually vary and must be kept in pencil. This table should accord with the book in which inoculations are entered. It may be carried on for several years in each unit and command, and will show the varying changes in its protection. Of course for each separate year a separate table may be kept on the same lines.

After writing the above the admirable Harben Lectures of 1910 by Lieutenant-Colonel Sir William Leishman have reached me. In the opening paragraphs of lecture 3, he states that he thinks the average duration of immunity after inoculations is about two years, and that he is in the habit of recommending re-inoculation after this period has elapsed. I think then we may definitely accept two years as a practical working basis of calculation. I propose also to continue the instruction that the red label on the medical history sheet be marked "Protected to.....Date....." In this way the fact that a man's protection is coming to an end is kept more or less in view. If he accepts re-inoculation he should, I think, be regarded as a *new* inoculation, and given a fresh entry in all records, including his medical history sheet.

It may prove interesting to record the present protection in Egypt, calculated on the two-year basis. It is as follows:—

PROTECTION AGAINST ENTERIC IN THE EGYPT COMMAND.

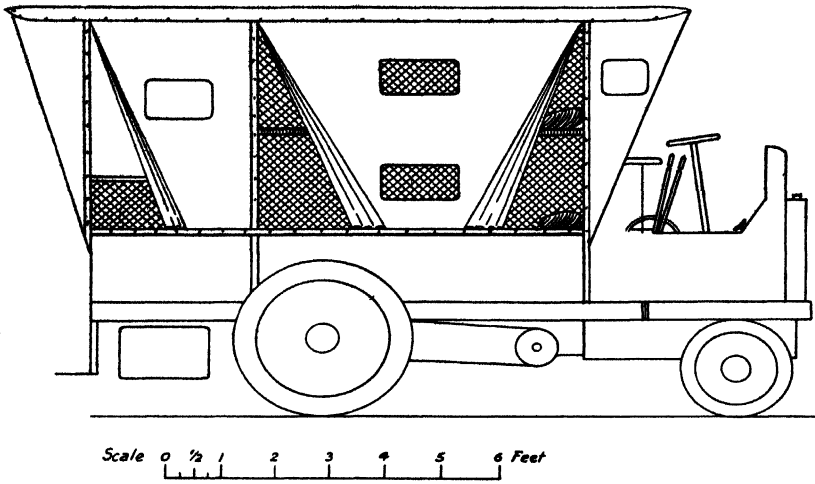
	7th Drgn. Guards	The Yorkshire Regt.	3rd Cold. Guards	4th Rifle Brigade	1st Welsh	All other Units	Totals
To autumn, 1910	206	182	295	618	525	113	1,939
,, spring, 1911	142	150	178	396	500	99	1,465
,, autumn, 1911	64	134	174	229	482	89	1,172
,, spring, 1912	0	109	89	190	35	41	464
,, autumn, 1912							

As Lieutenant-Colonel Leishman says, men have in many cases completely outworn their immunity, and this being the case his statistics may unquestionably be presented still more favourably, He gives as a result of records affecting some 20,000 men, a case incidence of 5·39 per 1,000 among the protected, as compared with 30·4 among the unprotected. But many of the cases shown as occurring among protected must have occurred among men who

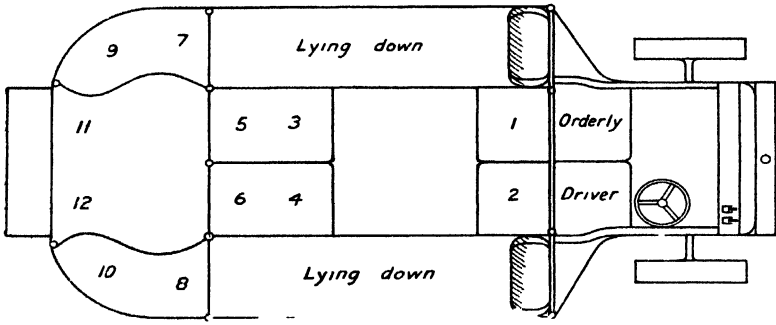
had really ceased to be protected. If tables such as I have suggested be generally compiled we could at least form alternative tables estimating the case incidence among men inoculated within two years. This might still be done for the year 1910, as the details of the cases are still in our offices, and it would be interesting to observe the variation from the figures 5·39 and 30·4 calculated without this proviso.

I see that Lieutenant-Colonel Leishman also refers to the difficulty experienced in inoculating men during the short time that elapses between the War Office notice that a draft is to sail and the date of embarkation. I think I have had sufficient experience to indicate the proper action to take to secure a large proportion of volunteers. The War Office should first arrange to give as long notice as possible. The date of embarkation being settled, the commanding officer of the unit should then definitely fix a date for the return of all furlough men at least seven or ten days before the ship sails, and he should also define the length of the furlough, three weeks or whatever it may be. If, then, he further orders that extra furlough up to ten days will be granted to all men who are reported to him as having received their first inoculation, and whose teeth are entirely in order, it will be found, as a rule, that there will be little trouble in obtaining the desired results. In one draft sent from the North of Scotland (from Fort George, then in the care of Captain F. McLennan, R.A.M.C.) every man was inoculated, and all had their teeth fully attended to. As each man was reported fit he went off. In fact the men were so anxious to get away that each tried to be first instead of last in being prepared. In addition two days light duty were sometimes given whether the man was affected by the inoculation or not, and for each inoculation. This idea also proved useful, as if a man was unaffected he had two days off duty in which to amuse himself, and the second inoculation was thus often accepted without a protest. What is needed is a little energy, the utilisation of the principles of self-interest among the men, and that the regimental officers should have constantly explained to them the meaning of figures such as Lieutenant-Colonel Leishman has formulated.

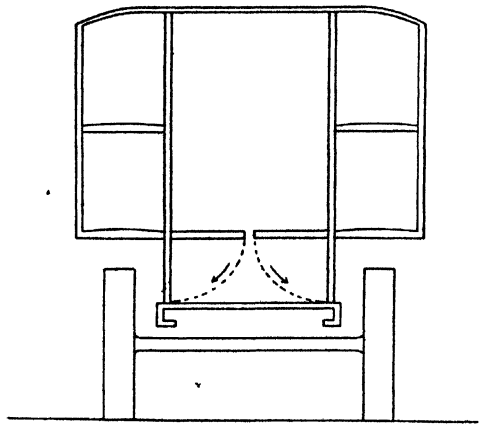
I may once more refer to Egypt. On different occasions this year the percentages of the sick in various units have been given in command orders, and the proportions of inoculations have been referred to in circulars to commanding officers. It is proposed to continue this system, as it is hoped that a healthy rivalry will follow upon the fact that the contrasts *inter se* are thus brought prominently forward.



(1) Side elevation.



(2) Plan of accommodation.



(3) Vertical transverse mid-section.

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THE MOTOR CLEARING WAGON.

By Captain F. HARVEY.
Royal Army Medical Corps.

The need of such a vehicle has become obvious; the type, however, is awaiting evolution.

Vehicles called "motor ambulances" were in use at the recent Army manœuvres. Their value was fully evident, their mechanical efficiency satisfactory, but the type of the body and chassis, for war purposes, was, to put it mildly, quite hopeless. The pattern had apparently been based on the design of the boxed-in horse-drawn ambulances provided with glass windows, such as are used for infectious cases by the Metropolitan Boards. These boxed-in bodies perched on heavy chassis and propelled by 45-h.p. 4-cylinder engines, provided inside sitting-up accommodation only, on the plan of a diminutive motor-omnibus.

These ambulances were extremely uncomfortable and stuffy and also shaky, owing to the solid wheels, the heavy bodies, and the very short powerful springs. They could, however, and did, travel sufficiently fast for all purposes. One of them attached to a division cleared the sick of three brigade camps daily, averaging a total daily mileage of nearly 60.

Owing to this vehicle the administrative medical dispositions assumed an entirely different aspect to what they would have done had only horse ambulances been available.

The economy of the whole proceeding was a revelation, and the idea at once suggested itself: *Given a certain number of these vehicles with an army in the field, the problem of the clearing hospital appears solved.*

But the manufacturer must first be shown what is wanted. It is quite unfair to criticise his boxed-in ambulance; he knows nothing about clearing hospitals or warfare, he has simply made a vehicle that will go, and placed a body on it, basing his idea on what he knows and has seen of ambulances used in civil life.

I have endeavoured to embody the following six essential points in the rough plans shown on p. 412.

They are: (1) Lightness; (2) Handiness; (3) Speed; (4) Comfort; (5) Maximum Accommodation; (6) Adaptability.

From the plan, taking first the side elevation, it will be seen that the chassis is 13½ feet long over all. The inside height is 6 feet, the total overwidth 6½ feet, and the external height 8½ feet.

The engine space is necessarily cramped, but there are several types of motor vehicles already on the market in which this occurs. In some of the motor-omnibus and lorry types the driver sits over his engine, and in some of the older Lanchester cars he sits on one side of it.

With regard to the wheels, which are solid, the smaller front pair should allow of half locking. The difference in diameter between the back and front is not so important as in the case of pneumatic tyres.

The short wheel base, the half locking, the moderate height secured by the small size of the wheels and chain drive, and the 45-h.p. 4-cylinder engines with four speeds forward and one reverse, should ensure (1), (2), and (3) up to thirty miles per hour.

Great attention should be paid to the springing arrangements, and all the latest devices, such as long springs, shock absorbers, and so on, should be tried to ensure even travelling and comfort (4).

Next comes the body work, and here, as in the chassis, lightness should be specially studied.

The drawing shows waterproofed canvas curtains, partly pulled back, exhibiting the sides of galvanised iron wire netting, and the positions of the beds or stretchers. Light is admitted through the mica windows, and also fresh air when desired. The vehicle is a touring car, and therefore (6) is secured. The hood is extended so as to give shelter to the driver, and also cover for the tailboard. The upper frame is supported by means of hollow galvanised iron stanchions, or bent hickory, reinforced by angle irons, if found better. The seating and lying accommodation shown in the plan secures (5).

Sixteen Patients can be Carried, Four of them Lying Down.—Seats (see plan) Nos. 3, 4, 5, and 6 are flap seats; Nos. 11 and 12 sit on the floor with their feet on the tailboard; Nos. 7, 8, 9, and 10 sit in the bay behind the rear axles. The orderly sits up in front with the driver, but he is at liberty to take an inside seat, if he wants to be with his lying-down cases, and to place a suitable sitting-up patient outside. Four specially made light stretchers form part of the permanent equipment of the vehicle, the patients lying on them while travelling. The ends of these stretchers could be made to run up and down in grooved stanchions for loading and unloading purposes, or if found easier, loading might take place from the ground by the side of the vehicle the wire netting being framed and hinged to allow of this.

These, and numerous other details and improvements such as storage space for kits, room for oil, tools, and spare parts, could be got out if one had a maker's specification or a model to hand.

In conclusion may I say that the idea that converted motor-omnibuses, lorries, or cars, or even the present pattern of motor ambulance, would be of any practical use should be given up at once. Any practical motorist, who has had experience of these types of vehicles, and who also knows what is wanted in the field will I think agree.

The *rôle* of the "motor clearing ambulance wagon" will be in the evacuating zone, and the region between the clearing hospital and the advanced base will be the scene of its greatest activity. Here it will save much time, horseflesh, and labour, to say nothing of its administrative economies; it will help to solve the blocked road problem on the lines of communication, and most important of all, from our point of view, it will make *the clearing hospital mobile and able to clear itself.*

United Services Medical Society.

A MEETING of this Society was held in the library of the Royal Army Medical College on February 8th. Fleet-Surgeon R. C. Munday, R.N., of H.M.S., "Hyacinth," East Indies Station, read a paper on different types of beri-beri occurring in naval ships cruising in the Persian Gulf during 1909-1910. He said that the number of men serving in the Gulf during 1909 was more than double that of any preceding year of modern times. The service is a very arduous one; no leave or exercise can be given to the men, and the supply of fresh provisions is very limited and of poor quality. The number of Asiatics serving in the ships of the Persian Gulf numbered 182 in 1909 and 317 during 1910—a very considerable increase. In 1909 nineteen cases of beri-beri, with seven deaths, occurred among Asiatics, whose staple diet was white, highly polished, over-milled, uncured rice; and as the result of substituting cured rice, increasing the nitrogenous part of the diet, and instituting other precautions, dietetic and otherwise, only two cases, and those doubtful ones, occurred in 1910. This was most satisfactory, but the extraordinary part was that, although no European was attacked in 1909 when the epidemic among the Asiatics occurred, in 1910 there were seventeen cases of beri-beri among them, while, with the exceptions before stated, the Asiatics escaped. From the clinical evidence there could be no reasonable doubt that all these seventeen cases should be classed as beri-beri. All classes were affected. Uncured, over-milled rice did not form part of their diet; indeed, in many of the cases no rice was eaten, and Fleet-Surgeon Munday advanced the opinion that when beri-beri occurred in the Asiatic rice-eater, the cause lay in the poverty of his rice, which has lost by over-milling certain necessary ingredients, but that when it occurred in the European *non-rice eater* the cause lay not in the rice (which was not his staple food), but in a deficiency of some other article of food, which, or portions of which, were vital to the proper nutrition of his nervous system. This lack might be brought about by inability to assimilate the necessary portions, even when present in the diet; through mal-digestion, caused by inferior quality of food, nervous depression due to climate, monotony of service, lack of exercise, &c.

The paper was discussed by Fleet-Surgeon W. E. Home and Staff-Surgeon O. Rees, and the debate was wound up by the President, Sir David Bruce, who expressed a hope that over-milled rice would be interdicted for the future. While expecting that the work of Fraser and Stanton and other observers would hold good, he could not help thinking that the explanation they offered was almost too simple. For his own part he thought that probably some peculiar protein body had disappeared from the over-milled rice, though what it was no one could yet tell. This protein body might be absent from the diet of Europeans, as in the case of the European outbreak described in the paper.

Clinical and other Notes.

NOTES ON A CASE OF SYPHILIS TREATED WITH SALVARSAN.

By Captain H. K. PALMER.
Royal Army Medical Corps.

The following statement of one of the earliest cases of syphilis treated in India by the new remedy known as salvarsan presents features of interest to all military medical officers.

History of Case.—Private G., 2nd Royal Welsh Fusiliers, was infected in Rangoon in April, 1910. The primary sore appeared on May 11th, 1910. He was placed on the syphilis register on June 16th, 1910, at Rangoon, and has been in hospital continuously for syphilis since May 11th, 1910. He arrived at Colaba Station Hospital on December 8th, 1910, as an invalid for discharge from the Service in England.

Condition on Admission.—The lobe of the left ear was ulcerated and partially destroyed. There was also extensive infiltration and ulceration of the upper lip, causing such severe pain during mastication that only fluid nourishment could be taken. Further, there was ulceration involving almost complete destruction of the nasal septum, with a fœtid discharge from the nose, accompanied by much pain in the frontal sinuses. There was some ulceration of the right lower eyelid. The patient had syphilitic arthritis of both knees, ankle and wrist joints. The cervical glands on the right side were as large as a hen's egg. The general condition of the patient was pitiable; he could not sleep or eat, and was in great pain and mental distress.

He remained in much the same state, in spite of all ordinary remedial measures, until January 4th, 1911, when it was decided to try the effect of salvarsan, a supply being then available.

Progress of the Case.—During the evening of January 4th, 1911, the patient was given an injection of salvarsan made up to about 8 cc., and injected into the muscles round the angle of the scapula. The process was moderately painful, and that evening the temperature rose to 100° F. There was pain and swelling round the site of injection, and some discomfort. Sleep was induced by an injection of morphine.

On the morning of January 5th, the temperature was 100·4° F. The patient complained of pain at the site of the injection, where there was a swelling the size of a turkey's egg, the skin over it being red. Mentally he had much improved and was not so restless, the local conditions were about the same. Instead of morphine a mild sleeping draught was given (for the past four nights patient had had morphine).

Next day the patient's condition generally had improved; he was not restless, and had little discomfort; the redness round the ulcerations had considerably diminished, and there were already (in thirty-six hours) active signs of healing. He had a good night's sleep; the urine was normal. The glands on the right side of the neck were smaller and the discharge from the nose was less.

On the 7th the temperature was normal, patient being much better in every respect; all the ulcerations were rapidly healing; the discharge from the nose remained about the same. He had a restful night; urine normal. There was still some swelling at the site of the injection, which was painful, the pain extending to the muscles at the back of the neck.

On the 8th, the improvement was still very marked. He had a good night and was able to eat solid food, the swelling of the upper lip and the pain being so much better. The discharge from the nose was less, and he had no pain in the head; the urine was normal. The swelling at the site of injection was smaller and less painful.

The temperature remained normal all day on January 9th, and the general and local conditions had so far improved that the patient was able to get up and walk about, saying he felt a new man.

On the 10th, the improvement both local and general was well maintained, the glands on the right of the neck being about the size of a pea; urine normal, appetite and sleep excellent; temperature normal.

On the 11th the patient had some headache and pain in the region of the frontal sinuses after the usual nasal irrigation of 1 in 1,000 solution of perchloride of mercury; this was the first time he had complained of this pain since the injection. The ulceration of the left lobe of the ear had completely healed, the ulceration of the upper lip was improving, the latter being about half the size it was before the injection. The glands of the neck were only just palpable, and the patient's general condition was excellent, no rise of temperature, urine normal.

On the next day all pain referred to in last note had gone; nasal irrigation was discontinued. The patient seemed very well and all the local conditions were rapidly improving.

The improvement continued uninterruptedly, and in three weeks the man was practically restored to health again and asked to be allowed to rejoin his regiment.

Lieutenant-Colonel Adams, R.A.M.C., in command of the Station Hospital, Colaba, adds the following remark:—

The effect of this one dose of salvarsan was nothing less than marvellous. A day or two before the man was in such a miserable condition that he was almost suicidal, and it was not considered safe to keep him in an upstairs ward. He was unable to eat or sleep, and had severe pain in the head. The ulceration and other symptoms were rapidly increasing. The injection was given about 4.30 p.m., and by the next morning the

pain in the head had gone and the patient had a brighter appearance. In eighteen hours he was able to eat, and was laughing and joking with the other patients, saying that he was altogether a different being. Healing had commenced in six days, and in less than a fortnight the ulceration was practically gone. In another week it is probable that only scar tissue will remain. The injection is a painful process.

REPORT ON THE TREATMENT OF A CHRONIC TYPHOID CARRIER BY A SPECIFIC VACCINE.

By Major R. W. CLEMENTS and Captain A. DAWSON.
Royal Army Medical Corps.

This case belongs to Group III. of the classification of "Carriers" suggested by the Sub-Committee, Army Medical Advisory Board in their recent report on the treatment of "Typhoid Carriers"—"An intestinal case with symptoms of inflammation of the gall-bladder. Typhoid bacilli excreted in the fæces, but obviously having a focus in the gall-bladder."

Private C., 1st Battalion Sherwood Foresters, was admitted to the Station Hospital, Bangalore, suffering from enteric fever on September 18th, 1909, and transferred to the Enteric Convalescent Depot, Wellington, on November 9th, 1909.

He had been inoculated against enteric fever on April 3rd and 17th, 1909, with a vaccine dated March 4th, 1909.

The case may be described as mild, and the temperature fell to normal at the end of the third week of the illness. On arriving at Wellington he complained of slight pain over the region of the gall-bladder. Widal's reaction 1 in 200.

Examination of the urine and fæces was commenced on November 19th, and has been continued five times weekly since that date.

At first the *Bacillus typhosus* was found intermittently in the fæces (twice in every ten days), but from February 15th, 1910, it was found almost daily for three months.

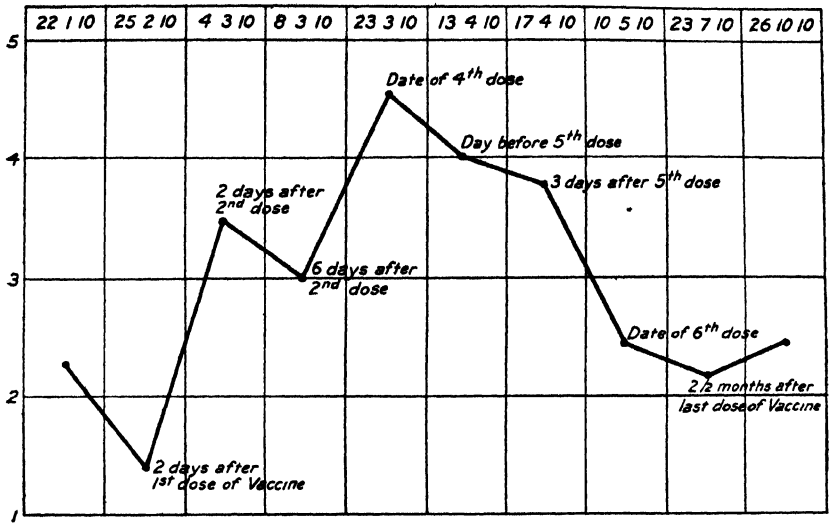
The bacillus was not recovered from the urine (see p. 423).

On January 19th the Widal reaction was again tested and found positive in 1 in 300 but negative in higher dilutions.

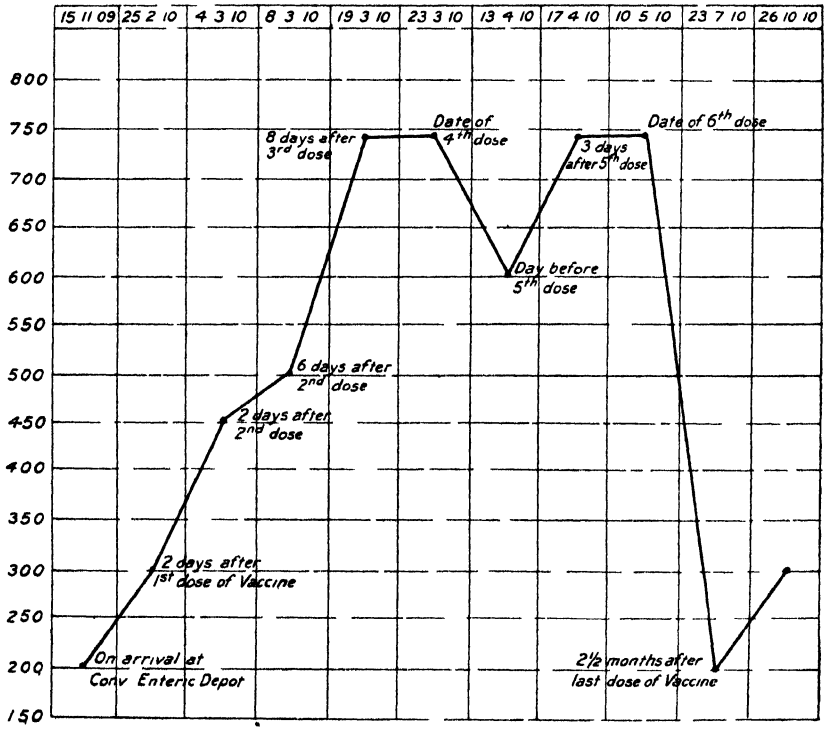
On the same date his phagocytic index was tested by Wright's method and found to be 1·9, the stock laboratory culture of *B. typhosus* being used.

On January 22nd, phagocytic index tests were carried out by Leishman's method, using laboratory culture *B. typhosus* and *B. typhosus* C (obtained from the man's fæces), with the following results:—

	B.t. (C.)	*B.t.* (Lab.)
(1) Control blood	1	1
(2) C.'s blood	1·8	2·3
(3) Another enteric convalescent's blood	1·3	1·7
(4) Blood from a person inoculated twice (Dec., 1907, and Nov., 1909)	1·01	1·08



PHAGOCYTIC INDEX DURING VACCINE TREATMENT.
Pte. C., 1st Sherwood Foresters.



WIDAL REACTIONS DURING VACCINE TREATMI NT.
Pte. C , 1st Sherwood Foresters.

A vaccine was prepared from the *B. typhosus* (C) by the method described by Major Grattan in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, July, 1909, the strength being 250 millions per cc.

The particulars of vaccination are as follows:—

Vaccine (specific) administered on—		
February 23rd	125 millions	Local reaction and malaise.
March 2nd	125 ,,	Very slight reaction.
,, 11th	150 ,,	Local reaction and malaise.
,, 23rd	150 ,,	,, ,,
April 14th	500 ,,	Very slight reaction. Pain over gall-bladder during last two days.
May 10th	600 ,,	Slight reaction. Complained of severe pain over gall-bladder for the last few days.

OBSERVATIONS MADE ON WIDAL'S REACTION, PHAGOCYTIC INDEX AND BACTERIAL COUNT IN FÆCES DURING VACCINE TREATMENT.

	Widal's reaction positive	Phagocytic index	Bacterial count, *B. typhosus* in fæces
February 25th	1 in 300	1·5	—
March 4th	1 in 450	3·5	—
,, 8th	1 in 500	3·0	—
,, 19th	1 in 750	—	55,000 per grm.
,, 23rd	1 in 750	4·6	44,000 ,,
,, 31st	—	—	114,000 ,,
April 13th	1 in 600	4·0	—
,, 17th	1 in 750	3·8	10,000 ,,
May 10th	1 in 750	2·5	—
July 23rd	1 in 200	2·2	—
October 26th	1 in 300	2·5	—
April 22nd	—	—	155,000 ,,
,, 26th	—	—	84,000 ,,
,, 27th	—	—	98,000 ,,
May 4th	—	—	Very few.
,, 5th	—	—	,,

On May 15th, five days after the last vaccination, as the pain over the gall-bladder was very severe, he was admitted to hospital. The gall-bladder was easily palpable, temperature 101° F., and there was bilious vomiting three or four times daily; the case was diagnosed acute cholecystitis. These symptoms continued for about a week, during which the gall-bladder was easily palpable. The symptoms gradually improved, but again became more acute on June 15th, the exacerbation lasting three days.

On June 22nd, an abscess formed at the angle of the right jaw; pus from this was examined for *B. typhosus* with negative results, the only organisms present being the *Staphylococcus pyogenes albus* and *aureus*. He was discharged from hospital on August 2nd, 1910, and returned to the Convalescent Depot.

No *B. typhosus* have been isolated from the fæces since June 20th, 1910; particular care has been taken to see that the samples of fæces are not tampered with (they are taken from the laboratory latrine used every morning by the convalescent).

This case is interesting as being the first recorded cure of a gall-bladder carrier.

As to whether the treatment by vaccine was the cause of the attack of cholecystitis, I am unable to give a definite opinion.

It is, however, certain that the cholecystitis was the immediate cause of freeing the gall-bladder of all foci of infection.

RESULTS OF QUALITATIVE EXAMINATION OF FÆCES AND URINE FOR *B. typhosus*.

Private C., 7th Sherwood Foresters.

Pte. C.	*November*, 1909.								*December*, 1909.								
Dates ..	19	22	23	24	25	26	29	30	1	2	17	20	21	22	23	29	30
Fæces ..	+	−	−	−	+	−	−	−	−	−	−	−	−	−	+	+	−
Urine ..	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−

Pte. C.	*January*, 1910.																				
Dates ..	3	4	5	6	7	10	11	12	13	14	17	18	19	20	21	24	25	26	27	28	31
Fæces ..	−	−	+	+	+	−	−	−	−	−	−	−	+	−	−	+	−	−	−	−	−
Urine ..	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−

Pte. C.	*February*, 1910.																				
Dates ..	1	2	3	4	7	8	9	10	11	14	15	16	17	18	21	22	23*	24	25	28	
Fæces ..	+	+	+	+	+	−	−	−	−	−	+	+	+	+	+	+	+	+	+	+	
Urine ..	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	

Pte. C.	*March*, 1910.																				
Dates ..	1	2	3	4	7	8	9	10	11	14	15	16	17	18	21	22	23	28	29	30	31
Fæces ..	+	−	−	+	?	−	−	+	−	+	+	−	−	+	+	+	+	+	+	+	+
Urine ..	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−

Pte. C.	*April*, 1910.																				
Dates ..	1	4	5	6	7	8	11	12	13	14	15	18	19	20	21	22	25	26	27	28	29
Fæces ..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	−	+	+	+	+
Urine ..	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−

Pte. C.	*May*, 1910.																			
Dates ..	2	3	4	6	9	10	11†	13	16	17	18	20	23	24	25	27	30	31		
Fæces ..	+	+	+	+	+	+	−	+	+	?	−	−	−	−	+	−	?	?		
Urine ..	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−		

Pte. C.	*June*, 1910.																	
Dates ..	1	3	6	7	8	10	13	14	17	20 (3 colonies)	21	22	24	27	28	29		
Fæces ..	−	−	−	−	−	−	−	−	−	+	−	−	−	−	−	−		
Urine ..	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−		

Pte. C.	*July* 10, 1910.																	
Dates ..	1	4	5	6	8	11	12	13	15	18	19	20	22	25	26	27	29	
Fæces ..	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	
Urine ..	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	

Examined eighty-seven times since July 29th, 1910: results negative.

\+ *B. typhosus* found.
− ,, not found.
? Doubtful—too crowded.
* Treatment commenced (vaccine).
† ,, stopped.

OBSERVATIONS MADE ON WIDAL'S REACTION, PHAGOCYTIC INDEX AND BACTERIAL COUNT IN FÆCES DURING VACCINE TREATMENT.

Date	Widal—positive	Phagocytic index	Bacterial count, *B. typhosus* in fæces	Remarks
February 25th	1 in 300 ..	1·5	—	2 days after 1st dose of vaccine .. 125 millions.
March 4th	1 in 450 ..	3·5	—	2 ,, ,, 2nd ,, ,, .. 125 ,,
,, 8th	1 in 500 ..	3·0	—	6 ,, ,, 2nd ,, ,, .. 125 ,,
,, 19th	1 in 750 ..	—	55,000 per grm. ..	8 ,, ,, 3rd ,, ,, .. 150 ,,
,, 23rd	1 in 750 ..	4 6	40,000 ,, ..	Date of 4th dose of vaccine .. 150 ,,
,, 31st	—	—	114,000 ,, ..	..
April 13th	1 in 600 ..	4·0	—	..
,, 17th	1 in 750 ..	3·8	10,000 per grm. ..	3 days after 5th dose of vaccine .. 500 ,,
,, 22nd	—	—	155,000 ,, ..	..
,, 26th	—	—	84,000 ,, ..	..
,, 27th	—	—	98,000 ,, ..	..
May 4th	—	—	Very few	..
,, 5th	—	—	,, ...	..
,, 10th	1 in 750 ..	2·5	—	Date of 6th dose of vaccine .. 600 ,,
July 23rd	1 in 200 ..	2·2	—	..
October 26th	1 in 300 ..	2·5	—	2½ months after last dose of vaccine.

A CASE OF EMBOLI ORIGINATING FROM A CARDIAC CLOT PRODUCING ACUTE ABDOMINAL AND OTHER SYMPTOMS.

By Lieutenant J. B. JONES.
Royal Army Medical Corps.

Private A., aged 34, service seventeen years, married, was carried into the Military Hospital, Londonderry, at 9 a.m., on the morning of May 21st, complaining of very severe pain in the lower part of the abdomen on the left side, and he stated that he had vomited during the night.

He said that for the past six weeks he had been greatly troubled with constipation, and attributed the onset of his present acute illness to a dose of salts which he had taken forty-eight hours before admission.

From May 7th to 17th he was a patient in this hospital, the principal symptom being pains in the back. During that time his bowels acted regularly after purgatives; there was no vomiting, and on discharge there was no sign of rupture or abdominal tumour.

On admission he was very anæmic, indeed almost cachetic, but stated that he had not noticed any change in his appearance of late years. He looked very ill, his face was pinched, and his pulse rapid and feeble. A large tumour could be seen and felt in the left iliac fossa and on the same side there was a small, incomplete, but irreducible, inguinal hernia; this and the tumour were dull on percussion and extremely tender on palpation. The movements of the abdominal walls were good except in the region of the tumour. Examination *per rectum* revealed the presence of hard scybalous masses. Frequent enemata produced no result but some flatus was passed. As his condition was becoming worse, and symptoms of collapse were beginning to appear, strychnine was injected hypodermically, and immediate operation decided upon. Operation at 3 p.m.

The hernia was cut down on, and found to consist of a strangulated appendix epiploica; the hernial sac contained blood. The abdominal ring was then opened up and the strangulated contents of the sac were drawn down as far as possible, ligatured and cut off in spite of the fact that really healthy tissue had not been reached. The inguinal canal and wound were then closed.

The abdomen was now explored through a separate incision and the tumour was found to consist of the greatly swollen left iliac meso-colon, which looked quite black; one-third of the circumference of the bowel next to the meso-colon was also very dark in colour. The abdomen was rapidly closed, and the patient put back to bed in a collapsed condition. Saline injections were administered *per rectum* and strychnine hypodermically. The patient improved towards evening, and took small quantities of liquid by the mouth. After the operation the patient did not suffer from any abdominal pain, there was no further vomiting, and he passed two small motions, the result of saline enemata.

May 22nd.—The patient did not sleep during the night, but is easier and stronger to-day; slight jaundice is noticeable and the right hypochondrium is tender, but flatulence and distension are troublesome. Albumen water only given by the mouth. Purgative enemata still fail to produce any results. Strychnine and saline injections continued.

May 23rd.—He kept well till 4 a.m., when he suddenly became collapsed, and could not retain the saline injections. The abdomen was tympanitic, and the heart was displaced upwards. Strychnine and stimulants were administered, and two pints of saline fluid were infused into the cellular tissue of the chest. These measures were followed by some improvement. A little later on an enema produced a slight action of the bowels, after which large quantities of flatus were passed. Powders containing salol and bismuth were given by the mouth.

May 24th.—The patient slept a little during the night, and is easier to-day. The wounds were dressed for the second time. Enemata were followed by slight results. Calomel in one-grain doses and bicarbonate of soda were given hourly for four hours.

May 25th.—Last night the patient slept for four hours, after which the bowels moved well, causing some discomfort. No blood was detected in the motions. He is taking nourishment well.

May 26th.—He had a good night. The abdominal distension has now disappeared and the tumour can be palpated up to the left hypochondrium. A mitral systolic murmur is audible to-day for the first time. The patient has complained of pain in the left leg for the past twenty-four hours; this has now become worse, and the femoral pulse can no longer be detected.

May 27th.—The patient is better and is taking nourishment well. He had two motions as the result of half an ounce of castor oil. At 9.30 p.m. he cried out and immediately became unconscious, the limbs were flaccid, the pupils dilated but equal, and the breathing deep. He died at 10.12 p.m. without having recovered consciousness. Blood-films made before death showed a very profound anæmia of a secondary type, the number of red corpuscles was reduced, the hæmoglobin greatly reduced, a moderate leucocytosis, but only slight poikilocytosis.

Post-mortem Examination.—The abdomen contained a large quantity of blood-stained fluid and many clots. The left iliac meso-colon was greatly swollen, black, and friable, and occupied the whole left side of the abdomen; but strangely enough the bowel appeared to be quite healthy. The other abdominal viscera were all healthy. The embolism could not be identified in the left iliac or femoral arteries, as only a limited examination was permitted. The skull cap was not removed. The heart showed no signs of valvular disease or atheroma, but a large *ante-mortem* clot was found in the left auricle.

The case was evidently one of multiple emboli originating from the lot in the left auricle. Why this clot should have originated is not

clear, but it may have been the result of his severe anæmia, the predisposing causes of which were malaria and syphilis, from which he had suffered; the syphilis only received symptomatic treatment by the mouth. The strangulated condition of the hernia can only be accounted for on the supposition that the straining induced by the purgatives had forced the appendix epiploica into the inguinal canal, and that while in this position the left colic artery became occluded by a thrombosis, in consequence of which an extreme degree of engorgement of the colon and its appendices was set up, resulting in a condition of strangulation. The revitalization of the bowel, of which a considerable portion was black at the time of operation, is interesting and shows the very free anastomosis of the blood-vessels of this part of the lower bowel.

There is a considerable amount of literature on the subject of superior mesenteric thrombosis, but I have failed to find more than a mere mention of the possibility of thrombosis of the inferior mesenteric artery.

A CASE OF PENETRATING WOUND OF THE CHEST: OPERATION—RECOVERY.

By Captain W. L. BENNETT.
Royal Army Medical Corps.

This case is recorded on account of the peculiar complications, both as a result of the injury and following on operation.

Private G. S., 2nd Bedfordshire Regiment, employed in the shoemakers' shop, was cutting the sole of a boot towards his chest, when the knife slipped, penetrated his leather apron and entered the chest. He fell down and was carried to hospital at 2.30 p.m. on April 30th, 1910. Half an hour after the accident I saw him, when his condition was as follows: Pale, very collapsed, and with a cold sweat all over him, he exhibits signs of active hæmorrhage, with rapid fluttering pulse. There is no movement of the right chest, but breath sounds are to be heard faintly. Over the fourth interspace, about one inch from the right sternal margin is a linear wound, almost horizontal, which carefully probed goes into the chest 1½ inches or more. Shirt blood-stained, but not excessively so considering the wound was a cut ¾ of an inch long. The wound was stitched, a full dose of ergotin injected hypodermically, and the patient placed in bed with the foot raised; the chest was firmly strapped on the injured side. He improved, but as the shock passed off and the circulation was restored, the right chest became progressively dull. At 8.30 p.m., remembering a previous experience at Edinburgh, where I found *post mortem* a small cut in the right auricle which might possibly have been sutured, I determined to operate with a view to stitching the wound in the lung, or tying the internal mammary artery, which I felt sure was bleeding. His condition was grave in the

extreme: great pallor, respiration very shallow and embarrassed, and pulse feeble and intermittent. With Major Cochrane giving chloroform, and the assistance of Colonel Culling, I rapidly made a crescentic flap of the muscles, convexity towards the sternal margin, and reflected everything, including the wound. The intercostal space was rapidly divided and search made for active hæmorrhage from the chest wall, but none found. On removal of the finger, the wound being retracted, fierce hæmorrhage, the worst I have ever seen, occurred. It welled out from a wound in the lung plainly seen, but the hæmorrhage became quickly so terrible that nothing could be done. It as suddenly ceased with collapse of the lung and cessation of respiration. We all thought the patient was dead, and I rapidly stitched up, but after an injection of ether and strychnine he showed some signs of returning animation. Warm salt solution was run into the flank, and after an interval he was put back to bed. At the end of five hours he rallied, breathing easily and quietly, with a steady but feeble pulse.

May 1st.—Salt solution injected into the right deltoid. Steadily improving.

May 2nd.—The patient shows signs of reaction. Salt solution discontinued in the evening.

May 8th.—Removed stitches, wound completely healed, no leakage.

May 15th.—Right chest dull up to apex. Potain's aspirator applied in axillary line as low as possible, and 30 ounces of altered blood removed. Patient's blood examined for leucocytosis, but none found.

June 3rd.—A puffy swelling now appeared in the right axilla, and in two days invaded the whole right front of the chest to mid-abdomen and upwards over the right side of the neck and face. I punctured with an aspirating needle and drew air.

June 17th.—Swelling subsiding. His face is now cyanotic and he has frequent attacks of dyspnœa. Condition grave, pulse appears to be failing, heart apex displaced well over to left axilla. Evening temperature, 102·4° F.

June 23rd.—Making little progress. The patient's blood has been repeatedly examined for leucocytosis by Major Cochrane, but the count has remained normal. From repeated explorations of the chest with an exploring syringe it is apparent that he is suffering from the effects of a large blood-clot in the pleural cavity. The question of rib resection and evacuation of this was considered unjustifiable in view of his serious general condition.

June 28th.—Pulse feeble, cough troublesome with tinged expectoration. Ascites is now developing rapidly. This, it is considered, is due to obstruction to the blood return, by pressure on the inferior vena cava. No signs of œdema anywhere else. Saline purges and digitalis in mixture given.

July 22nd.—Abdomen more distended. The question of tapping was considered but negatived. General condition as before.

August 20th.—Much improved. Expectoration less, abdomen with less fluid. He is in every respect better. Marked collapse of the right chest with retraction of intercostal spaces. Breath sounds clear at apex, but very distant at base.

August 24th.—Abdomen practically normal.

September 15th.—Temperature normal for the first time since the accident. Allowed up in a chair.

November 18th.—Brought before an Invaliding Board. His condition is now fairly good and he can do light work. He is somewhat anæmic, and has marked retraction of the right chest, with almost wooden dulness, but the breath sounds are clear at the apex, and faint at the base. Heart apex still well to the left of the nipple line.

A large venous communication (anastomotic) is evident between the right common femoral, through the superficial external iliac and a large plexus of veins over the back of the right chest. All the superficial veins of the right side are apparently enlarging.

I have, in conclusion, to thank Colonel Culling and Major Cochrane for their very kind assistance.

ETHER IN THE TROPICS.

By Captain V. T. CARRUTHERS.
Royal Army Medical Corps.

Why is not ether used more in the Tropics? One is told, to begin with, that it is not necessary, as chloroform is so safe. This was the argument formerly advanced in Scotland; and we see that it has been obliged at last to make way before advancing knowledge, until ether now bids fair to become the routine anæsthetic, as in London and America.

As a matter of fact, chloroform is probably no safer for Europeans in the East than it is at home. White people frequently die of it in both places. In five years six deaths occurred on the table from chloroform in the practice of Scotch surgeons known to me; and without making any special inquiry, I am informed, by onlookers at the operations, of two recent European deaths in India and Ceylon in the practice of Royal Army Medical Corps officers. Such cases are not published. Many occur which are not heard of except by the special inquirer.

Also, I think it cannot be contended that the risk of delayed chloroform poisoning is less in the Tropics. Considering the prevalence of hepatic disorders, it is reasonable to believe that this risk is even greater than in England. Also the well-known superiority of ether as a preventive of shock (so emphasised by Crile) must hold good whatever the climate.

An objection to ether often put forward is that the apparatus perishes in the heat. This drawback to bag-inhalers applies all over the world.

It is greatly diminished if paper bags are used. These are an improvement in every way over the old rubber bags, and they can be made in a few minutes by the hospital dispenser.

Another point alleged is that it is difficult or impossible to anæsthetise with ether in a very hot room. As to that it is doubtful whether the Eastern operating rooms are much hotter than those of Europe. By the time steam sterilisers, hot water pipes, warm filtered air and crowds of students have done their worst in the English theatre the temperature surely reaches as high as that of a carefully cooled tropical room!

However that may be, there is no doubt that satisfactory anæsthesia can be obtained in a very hot atmosphere, provided that the requisite skill is available. One has seen an inexperienced etheriser try unsuccessfully for nearly half an hour to anæsthetise an easy case which "went under" in a few minutes when an older hand took charge of the inhaler. The fault was obviously not in the climate, as it was stated to be at the time. It lay in the fact that the apparatus was so held that the patient was breathing fresh air, with hardly a scent of ether, under the edges of the face-piece, instead of properly ballooning the bag with each expiration and afterwards inhaling ether vapour from the appliance. Failure due to the same error of being content with a collapsed bag is often seen when students are learning in Edinburgh—a city that nobody would lightly accuse of having a torrid climate. The truth of the matter is that etherisation is quite as easy in the Tropics as elsewhere.

As regards the method, probably Clover's inhaler is the most suitable. I have successfully used the open method in a high temperature, but at an expenditure of ether that I have ever since striven to keep secret from the officer in charge of the hospital. Even in England one has seen 16 ounces of ether used for an ordinary appendicitis operation. Where is the military hospital that could long stand such a drain?

When using Clover's inhaler in a very hot atmosphere, it should be remembered that the ether evaporates much more quickly than in the cold. Therefore, when the indicator is at 1 the patient may get as much ether as he would with a record of 2 in colder surroundings. Possibly ether has been judged unfavourably in some cases because unpleasant symptoms occurred through ignorance of this rule.

It may, perhaps, be said that Ceylon, where these observations were made, is too cool for the results to be applicable in India. This may conceivably be the case, but the medical profession here, no less than in India, denies the possibility and usefulness of giving ether, and this for climatic reasons.

However, some successful tests were made at Trincomalee Naval Hospital in the heat of the day, where the temperature is probably as high as in most Indian Stations, and where I was assured by the naval medical officers that failure was certain.

Sport.

THE ABSORBENT-STONE.

A Day with Cobra-hunters.

By Captain W. F. REICHWALD.
Royal Horse Artillery.

Some years ago I was marching with my battery near Panipat in the Punjab. My Commanding Officer at the time was a keen sportsman, as well as a kind and indulgent person, who frequently gave me a day off, so that I might go wandering into the jungle instead of slogging along the hard high road by the side of my section. My *modus operandi*, on these "jungling days," was simple. I used to ride out of camp at dawn, or thereabouts, and, taking a couple of natives and a few sandwiches with me, I would make a wide détour and rejoin the battery at its next camping-ground when night fell. The country through which we passed was often quite unknown to me; little or no information of any value could be extracted from the inhabitants, and game was in many districts chiefly remarkable for its scarcity. It was, therefore, not surprising that at times my "bag" was small and that I frequently returned altogether empty-handed. Still, I used to enjoy hugging my rifle and waiting, after the manner of Mr. Micawber, for something to turn up. And if nothing turned up, well, it didn't matter; I knew I had had "a day in the country" and that was quite good enough for me. Besides, even if I never saw so much as a single head of game to fire at, there was always a possibility of my seeing sômething else of jungle life that was new and unknown to me. So I took my chances whenever they came, no matter how hopeless the prospects, and once, at any rate, I was amply rewarded for my pains.

On the day in question, things seemed hardly more promising than usual. The evening before, a minor magnate from a village close by had come to my tent and offered me his services if I wanted to shoot. Of course he swore that game abounded, and, equally of course, I did not believe one-tenth of what he said. This inevitable preliminary over, we got to business, made our terms, hatched our plot, and agreed to start before daybreak next morning.

It was bitterly cold when my bearer Sher Khan came to call me, and, for a moment or two, I felt I greatly preferred the company

of my little camp-bed to that of the genteel poacher who, for a consideration, had condescended to place his invaluable services at my disposal. However, Sher Khan was inexorable, and after a few minutes my numbed fingers were struggling desperately with breeches buttons and leggings; a cup of hot tea was gradually warming my interior economy, whilst the dull thud of my pony's hoofs fell on my ear urging me to be quick and "get a move on" my patient, shivering mount whose coat was staring like a hedge-hog's.

We were off well before the sun was up, and for some miles travelled at a fast walk through fields and scattered villages. Near one of the latter we passed the camp of the "Collector Sahib," all wrapped in peaceful slumber. I feared we might disturb the great man's dreams if the "pie-dogs" gave tongue, but so intense was the cold that even the noisiest of the village curs thought it better to remain quietly in their miserable shelters than to come out for their usual yap at the passing stranger. So we moved on in silence and, but for the patter of my pony's feet and the shuffling of those of the natives behind me, not a sound broke the stillness of the morning air. We emerged from the last village just as the sun's rays topped the horizon and showed up clearly the fantastic forms of the dense smoke-clouds that hung in great belts above the native hovels; they were weird and strange to look upon, these smoke-belts, as they swayed gently to and fro, but we quickly turned our backs on them and their nauseous, stifling smell, and were glad to breathe the purer atmosphere of the jungle that lay before us.

The country certainly looked promising, and my hopes rose steadily only to fall bit by bit as we scanned one likely spot after another without finding any game at all. Suddenly a magnificent black buck sprang up out of some high grass not eighty yards in front of me and went off with characteristic bounds. As bad luck would have it I was carrying my shot-gun at the moment, and the coolie who held my rifle had, of course, dropped behind, in spite of all my injunctions that he must stick to me like a leech. So I lost the buck as well as my temper, but resolved to shoulder the rifle myself for the rest of the day.

The sun was high in the heavens before we spied another good black buck. He was one of a herd that was lying down in the shade of some low trees on a piece of ground difficult to approach. My stalk failed, and I was about to seek consolation in sandwiches when I thought it would be wise to withdraw the cartridge I had

left in the chamber of my rifle. I pulled the bolt and out flew the case, but to my surprise the bullet itself remained firmly stuck in the barrel whence nothing that I could do would move it. This was most annoying. Here I was miles from the battery with at least six hours of precious daylight before me, with black buck in the neighbourhood and a useless rifle in my hands! However, things were not so bad as they seemed. My genteel poacher, who styled himself my "shikari" for the day, came to the rescue and put forward the one and only sound suggestion he had made since we started. He told me there was a village a mile or two out of our way where dwelt a "lohār" (native iron-worker) who would doubtless be able to force out the bullet with an iron rod. The lohār was found in due course, a few vigorous blows applied to the end of a stiff wire removed the obstructing bullet, and I had nothing left to complain of but the loss of time occasioned by our détour through the lohār's village. About this I, of course, did the usual "grouse," little dreaming that the circuitous route we had been compelled to follow would lead me to a spot where I was to witness a sight rarely beheld by any white man, even though his years in India were many.

We had put the village not more than a mile or so behind us when I noticed some grass huts of unusual design. I asked what they were and was told that they belonged to Kanjahs, or gipsies, who spent their days catching snakes and lived on the flesh of wild animals, including jackal. This information was of interest, so I ordered a quarter-right-wheel and made towards the dwellings.

As we approached the Kanjah women ran away, but the males came forward a few yards to meet us and then stood staring in sullen silence, evidently none too pleased about our intrusion. For some moments we stood facing each other without saying a word and I had time to take stock of the men before me. They were magnificent specimens of humanity; none of them appeared to carry a spare pound of flesh anywhere, and amongst the adults there was not one under six feet in height. Their long lithe figures were but scantily covered with clothing, and under their shaggy black hair peered eyes that had the unmistakable look of the wild man in them.

At last I broke the ice by addressing a few words of Urdu to one of their number, but so hopelessly "jungly" was the abrupt reply I received that I could not understand a syllable. Turning to my "shikari" for assistance, I told him to say that I did not wish to trouble my hosts in any way, but merely desired to see their snakes

if they had any they could show me. Judging by the tone, the answers given to my interpreter were as surly as the one vouchsafed to me, and it soon became evident that the sooner we made ourselves scarce the better would the Kanjahs be pleased. Before we turned to go, however, I pulled out a handful of small coins and gave a few to one of the men who appeared rather less stand-offish than the rest, and in doing so I took good care to let the others see what my hand contained.

Their attitude changed instantly. They smiled, became talkative, and showed every sign of wishing to establish better relations; they consulted together for a few seconds, and then offered to show me some snakes on condition that I remained where I was and did not approach any closer to their dwellings. To this I readily agreed, and a few moments later half-a-dozen brown figures were bounding through the jungle, towards another group of huts, at a pace that would have done credit to a Zulu. After a few minutes they reappeared bearing a number of firmly closed spherical baskets which they arranged in a circle around the spot I stood on. At a given signal from one of the men the lids were thrown open, when out of each basket there appeared the ugly heads of three or four cobras. For a moment the reptiles appeared dazzled by the sun, then they slowly uncoiled their subtle bodies and glided smoothly out of their prisons on to the ground. There they lay, or perhaps I should say sat, at least a score of them, writhing and hissing with expanded hoods, and heads swaying from side to side. They were, of course, perfectly harmless, as all had been fanged, but there is something peculiarly vindictive looking about a cobra roused to anger, and rarely have I seen any picture more perfectly illustrative of concentrated spite and hatred than was presented by the living ring now formed around me.

After watching the creatures for a while, I told the man to put them back in their baskets, and offered a reward of eight annas for every cobra they could catch in the jungle in my presence. My offer was accepted with the greatest alacrity, and I was soon striding rapidly across country with my strange acquaintances. We walked for a mile or so and then stopped in front of a low akh bush, under which was a hole that I could not, for the life of me, have recognised to be the outlet of a snake's burrow. I said it looked like an ordinary rat-hole, but the Kanjahs assured me that a couple of cobras lived there, and they forthwith proceeded to prove the correctness of their assertion.

While the rest withdrew a short distance, one of the men, who

had provided himself with a toomrie (wooden whistle), and had tucked under his left arm a steel rod with a hook at one end, took post in front of the hole and began the "magic" that was to entice the snakes from their safe retreat. The sound of his toomrie was not unlike that of the pipes used by certain native regiments, and it alternated, after every few bars, with a weird chant delivered in a clear, high-pitched voice. As the man played and sang in turn, he kept up a quaint dance accompanied by gestures that became more or less ferocious as the strains of the music rose and fell. How long this performance lasted I cannot say; I was too deeply engrossed in what I saw to take much note of time, and I hardly knew whether to rivet my attention more closely on the hole in the ground, or on the antics of the strange figure before me. My gaze was still travelling swiftly backwards and forwards from one to the other, when suddenly the man darted forward and, with incredible rapidity, made a lunge at the hole. The bright steel rod shot straight to the ground like a flash of lightning and then swished to one side, carrying with it, in the crook, a huge male cobra hooked just behind the head.

The whole thing had happened so quickly that I simply could not believe my eyes. There was the cobra without a doubt, but it seemed the men must have deceived me in some manner. I felt sure I must have been mesmerised, and made to see that which could never have occurred in actual fact. So I feigned anger, told the man it was all "bandish and sāzish" (humbug and trickery), and swore he had had the snake concealed in his clothes. This he firmly and solemnly denied, and, to prove his honesty, he offered to take off all his clothes and to catch another cobra in the same way. He declared the female was there too, and that, if I would but have patience, he would capture her as well. Then he divested himself of his garments, till not a rag remained but the smallest of loin-cloths, and the puggri wound about his head; but, before he resumed his incantations the male cobra had first to be secured.

The brute, apparently realising its helplessness, had made no effort to escape; it simply sat there enraged and baffled, hissing and writhing after the manner of its kind. As its captor approached, it raised itself higher and turned to face the long, lean hand and fore-arm extended towards it. Strange indeed was the similarity between the body of the beast and the limb of the man, but stranger still was the similarity of movement when they began the struggle for supremacy. As the snake advanced so did the hand withdraw, keeping always just out of reach. When the snake retired, the

hand followed instantly, ready to seize the initiative the moment the enemy gave way. Like two armies in the field they sought to take each other in flank; the snake apparently aiming at the wrist of the man, the man bent on seizing the neck of the snake behind the venomous head.

The smoothness with which the two combatants moved was wonderful to behold; there was something uncanny about them too, and so equally were they matched that, to my unpractised eye, it appeared as though neither would ever gain a definite advantage over the other. Yet the chances seemed to lie in favour of the cobra; it seemed incredible that a human hand, however skilled, could close upon that circling, swaying head, and yet avoid the fatal fangs. But the limb of the man was itself so snake-like in its poise and outline, that there might have been two cobras, each striving to deliver the lightning stroke that would give the one the mastery over the other. The swell of the half-closed hand looked like the inflated hood, whilst the wrist and forearm strangely resembled the portion of the cobra's body raised above the ground.

The other Kanjahs and I had formed a ring around the pair, and squatted low so that we might observe the better. No one spoke, nor stirred hand or foot, for they were as keenly interested as I was. Again I kept no count of time, and I was still gazing intently when the crisis came, with a suddenness that defies description. Before I could realise what was occurring the hand shot forward and, with unerring aim, gripped the head and held it as though in a vice. Violently, indeed, did the body of the snake curl and wriggle, but all in vain. The fatal jaws were pressed tightly together between thumb and forefinger, whilst the palm of the hand closed firmly round the neck.

The deed was done, and a few minutes later the snake was safely stowed away in one of the spherical baskets held ready for its reception. I hoped I should see the animal fanged, but, though the Kanjahs explained to me how they would set about it, they were evidently anxious to tackle the female before they did anything else. So I, unfortunately, gave way to them, with the result that I never saw a cobra fanged at all.

The details connected with the unearthing of the female were exactly the same as those I have already described, but on this occasion I checked the time. It was, unless my memory plays me false, just forty-five seconds from the first sound of the toomrie. The actual capture was also to be effected as before, but the man was nearly destined "to eat defeat" in this second encounter.

The female cobra, though rather smaller and weaker than the male, was equally full of fight and certainly quicker. Her "sparring" was wonderful, she kept her adversary at bay with consummate skill, and resorted to the offensive more frequently than her spouse had done. Yet the Kanjah was not to be outwitted easily, and for a while the game was well contested. At last the man believed his chance had come; he seized it, but ere his hand closed round the cobra's neck, she struck and plunged her fangs into a finger. It was well and smartly done, but just too late, for she could not withdraw; the hand came on despite its wound, and held her closely in its iron grip.

A low exclamation of surprise, half gasp, half murmur, broke from the other Kanjahs when they saw the blow go home, and whilst the snake was being disposed of, the murmur grew to a continuous chatter. It was evident that even they did not like one of their number being bitten, though it seemed hard to believe that the occurrence was a very unusual one. The injured man was immediately attended to, or rather, he at once began to attend to his wound himself. After squatting on his hunkers, he first took from a red cloth bag a piece of dried wood, or coarse root, and with this he drew rings round his forearm. The wood was light in colour, though whether it was prepared in a special manner I cannot say. It certainly left clearly visible grey lines, but these may have been no more than light scratches, that would naturally show up on the dry, dark skin of a native; at all events when I afterwards tried a bit of the root on my own wrist, no marks of any kind appeared. In answer to a question as to the object of the rings, I was told that the poison would not travel beyond them, and when I suggested that this must surely be a case of mere superstition, I was solemnly contradicted, and presented with a piece of the root for my own use in case of need. I kept it for a long while, and I believe I still have it somewhere amongst the curious odds and ends I have collected at different times.

The next step in the Kanjah's cure consisted in his squeezing out of the finger (the second of his right hand) as much blood as he could. He twisted it, bent it, and massaged it until two drops appeared where the fangs had entered, one on each side of the first joint. Then he moistened with saliva the top of the finger between the punctures, and placed on it a small circular stone, black in colour, and about the size and thickness of a halfpenny. This was, no doubt, the so-called "absorbent stone," about which a certain amount has, from time to time, been written. I know

little or nothing of its nature or properties, but I can testify that the stone I saw used stuck firmly to the flesh as soon as it was placed in position. The man moved his hand about freely and turned it over, back downwards, but the stone remained where it was until some twenty minutes had elapsed, when it dropped off of its own accord.

The falling of the stone was the signal for the break-up of the interested group of spectators, who had been watching the proceedings. The Kanjahs now appeared quite happy; they gathered up their traps, snake-baskets, &c., and strolled cheerfully back to camp. I went back with them and remained in their company for an hour or more, but no further thought was given to the principal incident of the day, nor did the cobra's victim appear any the worse for his injury. My chief desire was, naturally enough, to secure the stone, but the Kanjahs flatly refused to part with it under any circumstances, although I offered them every anna I had on me—some fifteen rupees all told, a small fortune for a wandering gipsy tribe.

Thus ended one of the most interesting experiences I have ever met with in the jungle. It is not my purpose to enter into the merits of the case, or to discuss the many theories that might be put forward; I merely wish to set down the facts as I saw them with my own eyes. There can be no doubt that the man was bitten by the cobra, that both he and his friends were considerably perturbed in consequence, that he cured himself in the manner described, and that no orthodox method of treatment was resorted to, not even a ligature of any kind was applied.

The shadows were lengthening when I said farewell to my friends, and I greatly regretted my inability to accept their pressing invitation to join them in a jackal hunt that was to take place after dark. I had a good many miles to go back to camp, and I did not quite know what my Major would say if, in the heart of the jungle and without permission, I spent a night "on the tiles."

The Kanjah method of jackal hunting, by the way, is simple. It appears they merely go off into the bush, and there squat down with their dogs close by them. Next they begin to caterwaul and to imitate the jackal's mournful, eerie cry until they entice him to close quarters; then the dogs are loosed, "jack" is collared, and served up for dinner the following day.

Their method of stealing dogs is equally effective, though how it is worked I cannot say; I can merely repeat a yarn told me by a friend of mine who, for a time, commanded the Government

Remount Depot at Karnal, and to whom I had related my experience of the "absorbent stone." He told me that on one occasion a British infantry regiment was in camp at Karnal for the night, and so, as was his custom when troops passed through, he asked a number of the officers to dine with him. They came and, in the course of the evening, the conversation somehow or other drifted on to the subject of dogs. The guests were full of praise for the animals they owned—one had a bulldog that would not let a native come within a mile of his tent; another possessed an Irish terrier, the best watch-dog ever born; a third owned some other breed equally ferocious, &c., &c. So the talk went on whilst my friend sat and listened in silence, knowing full well that a Kanjah camp was pitched within a short mile of the dinner table. When all had had their say, he had his, and he bet them a case of champagne that, if they would allow him to put their guardians to a practical test, he would guarantee that there would not be a single officer's dog left in camp next morning. At first my friend's offer was looked upon as a joke, but when he declared he was serious, and added that the dogs might be secured in any way the owners pleased, the bet was taken. The guests, on their return to camp, fastened up their canine companions in every sort and kind of manner. One was chained to a tent pole, another to his owner's bed, a third to a metal wash-hand-stand, so that he might bring it down with a clatter if he were interfered with in any way; and so on and so forth.

All went well, and the night passed without a sound, but when the officers were roused at dawn there was not a single dog to be seen. It was not till the second mile-stone on the Delhi road was reached that a diminutive Kanjah urchin checked the onward march of the battalion by blocking the road with a dozen dogs, ignominiously attached to bits of string looped round the urchin's fingers.

[NOTE.—A similar absorbent stone is used by the Indians in Texas.—ED.]

Travel.

ABRIDGED REPORT OF A TOUR FROM FREETOWN TO MONROVIA THROUGH THE PROTECTORATE OF SIERRA LEONE AND LIBERIA.

By Major A. PEARSE.
Royal Army Medical Corps.

(*Continued from p.* 330.)

Liberia.

I was met by a Customs officer who told me there was no objection to my coming over and going up country where I liked. I found the officials at this place most obliging and civil. Just as I was starting off Chief Besikaia arrived. I thought he was not coming, and told him so. He was quite hurt and said he had made a promise to come and he always did what he promised. The old man had hammocked all the way. I said good-bye to him, giving him a ring I was wearing as a token of my gratitude until I sent him something from England, expressing a hope that he would then return the ring.[1]

The road I travelled by was good, shady, and practically level. There was much cultivation (rice) on either side and the oil-palm was abundant everywhere. The people in the villages I passed through appeared quite friendly, but I did not stop, except for a moment or two, to speak to an old trader (native) who asked me where I was going. On replying that I was going to the interior he said it was dangerous and that he would not go there because the people were bad and wild.

Eventually I reached a town called Dumba, where I determined to stay the night. The chief's brother gave me a house and brought me a fowl and some rice as a present and also sold me more later. I found the price of rice both here and at all other places in Liberia nearly double the price that it was in Sierra Leone. Before reaching Dumba I had been warned not to let my dog walk into the town but to carry it, after crossing a certain stream, as no dogs were allowed in the town. The dog was accordingly carried. After

[1] This ring has now been returned to me in exchange for a present which I sent him and which Mr. H. C. Lukach (Private Secretary to His Excellency The Governor, Sir Leslie Probyn, K.C.M.G.) kindly forwarded for me from Freetown.

reaching the place I made inquiries, and was informed that the people of the town always killed any dogs that came there if they belonged to a black man, but that a white man might bring his dog if it was carried, and he gave something to keep away the "bad medicine" which the dog might bring—I accordingly gave the people a "dash" and some tobacco, which put matters right.

Leaving Dumba the next day, I passed through country which became more hilly, and less cultivated as we went on, though the oil-palm was still abundant. The road as far as Da is good.

Da is generally known as "La" by the natives on the British side of Mano River. It is a dirty town consisting of about twenty-five houses. On the outskirts of the town, on the west side, are "the Barracks." These consist of two long wooden houses side by side, with a raised verandah in front, facing south. These huts occupy an open space some 80 yards square surrounded by a stockade about 12 feet in height. The space between the huts and the stockade is used as a parade-ground for the detachment. Only eight men are at headquarters, as a rule, the remainder, one non-commissioned officer and fifteen men, being posted at different points along the frontier, to watch the ferries and fords and collect customs.

On reaching the town I went to the Barracks. Here I found the men on parade. The Commanding Officer, Captain Moore, shook hands and received me cordially, saying, "How do you do?" and "How's the fashion?" &c. He then invited me to sit down in his verandah, and we had a talk while he sent to get a house ready for me. After a time he conducted me to my house and left me.

During my stay at Da we had several interviews. He informed me that he was a Congo boy and had been on the Anglo-Liberian Boundary Commission, also that they draw all their supplies from the country, and that formerly there had been much trouble with the natives in his district, but that all was now quiet and peaceful and the people were well in hand.

The chief articles of trade which passed through his hands were trade gin, rum, palm wine, rubber, and some ivory. Regarding the rubber, he stated that there was a large quantity in the surrounding forests. I, myself, saw it in several places along the roads.

From Da I reported my presence in Liberia to the British Consul at Monrovia. The letter apparently never reached its destination, at least it had not done so when I arrived in Monrovia five weeks later.

Da is considered an important town from a strategical point of

view, as many of the roads from the interior, to the Mano River and the south, converge on it. It is surrounded by "big bush." The inhabitants belong chiefly to the Vai, Gola, and Mendi tribes; of the last named there is quite a large colony.

One or two incidents occurred during my stay in the town which may be of interest as showing the character of the people one had to deal with and the position one was in.

Before going out one day in search of elephant (Captain Moore had previously given me a free hand to go where I liked) I went to see him. Just then the sub-chief of a neighbouring town arrived, and I was informed that he (Captain Moore) had to make some arrangements about my shooting, so they must talk the matter over together.

I went back to my hut and waited. After a time Captain Moore, escorted by three men of his detachment (armed with rifles), arrived with the sub-chief, and came into the hut. After some talk, it was evident the sub-chief wanted a "dash," so I gave him some money and tobacco. It was then arranged that I should go to the sub-chief's town as the elephants were said to be near there. This did not apparently suit Captain Moore, who said the people wanted to go and consult about the matter, and that he must go with them. He did so, but as he went told one of his escorts to come into my hut and look after me. I remarked there was no necessity to do so, as I was not going to run away. He laughed and took the man out, but left him standing a little distance from the hut. After a time they all came back quite pleased, and said it had been arranged for me to go to the sub-chief's town the next day. To this I agreed, and they went away. Next day I started off escorted by two of the detachment, and on arrival at the town was well received by the sub-chief. On inquiring the direction in which the elephants were, I was told they were a long way off, and that I had better go on to the next "half town" (a small town midway between two large towns), and send back for my baggage. I would not agree to this, but said I would go back myself and pack up, and then come the next day if I thought it worth while. I did not, however, go, as my head boy got information that elephants had recently been seen along the Gissi road—the direction in which I wanted to go.

The next day I went to Gissi to make inquiries and found out that elephants had been in the neighbourhood a day or two previously. On my return to Da I was informed that two of my boys had been arrested for assaulting two women on the road, and frightening

them by pretending to be Poro boys. It is a great crime for a woman to see a Poro boy during the period of his seclusion and, also, for a Poro boy to show himself to a woman during that period. To avoid such a calamity when going about the women and girls are obliged (under grievous penalties) to give a peculiar shout or cry every few seconds, and the boys to make a noise (beating a tortoise-shell with a stick being a common method), as a warning of their approach. By mutual arrangement, without seeing each other, one party then hides till the other has passed or gone away.

Whether there was any truth in the charge or not, I do not know. However, soon after my return, I got a note from Captain Moore stating that two of my boys had been brought up for frightening women, and he had inflicted a fine of £3. I did nothing, but waited. Soon afterwards Captain Moore came to see me about the "palaver." He informed me that there had been a great fuss, and he only refrained from putting the boys in prison because they were MY boys. I said he might do so, but suggested that, as there was apparently some mistake on both sides, it would be better to give some compensation to the injured parties, instead of my paying him £3, which would have to go to the Government, and for which I should want a receipt. He thought over this, and eventually agreed. They were all quite pleased. I have no doubt that it was a put-up job to extort money, as the Poro Society has great influence at Da.

The day after this occurrence I left Da, but before I went Captain Moore gave me a passport for free passage through Liberia to Monrovia.

After leaving Da I stayed a few days at Gissi. Almost immediately on arrival in the town I was threatened with another "woman palaver," as it is called on the coast. In this case one of my carriers had chanced to ask the wife of a man (Georgie Paul) to be his friend, in other words to cook his food for him, a common custom in Mendi country. Georgie, on hearing this, was very irate, and came to me and complained, saying it was a terrible offence to do such a thing in his (Vai) country. On inquiring further into the matter, I discovered there was no objection to the woman cooking the boy's food, but the trouble was that the boy had asked the wife to be his friend without first being the man's friend. The rule is that a man must first be the friend of a man before the woman can or may be asked to do anything for him. However, the mistake was explained, and nothing more was heard of it.

Leaving Gissi, I started off for Tappoima, the chief town of the

Gola tribe. Owing to the accounts I had received from Captain Moore, and the evident dread and respect in which the natives ("wild people") of that part were held by the Liberians whom I had met, I was naturally rather anxious as to what kind of reception I should meet with.

The road lay through hilly forest country. The first town reached was Vagre after a march of about three and a half hours. There was much cultivation round the town in all directions for a distance of a mile or so. The town consists of about fifty houses, built very close together. It is rather a dirty town. After a short stay I left. I took the Heye road and arrived there late in the afternoon. During the march from Gissi to Heye I noticed granite aud quartz in several places. Laterite rock was, however, the most common and extensive rock formation that appeared on the surface. The town is a dirty one, and as the chief was away I had some difficulty in getting a house. However, after a little persuasion I was provided with one. There are about fifty houses in the town, and the country to the south is for some distance under cultivation. Here, as in most of the towns of the interior, I found myself a source of interest and amusement to the inhabitants. Many of the towns through which I passed had never been visited before by a white man, and consequently few of the people had ever seen one. At this particular town I had my dinner in the open outside my hut, and practically the whole village stood round to watch me eat it. In some places where I stayed a day or two and the people had got over their first impulse to run away, they would come, when I was sitting quiet, and touch my clothes and hands and go away laughing and making remarks.

On leaving Heye the acting head man accompanied me for a short distance to show the road. The march at first was through big-tree forest country, but afterwards we passed through much cultivated land, until Gondo was reached after crossing two rivers, the Mahei and the Yamasse. The latter has a fine native bridge, 40 yards long, over it.

Gondo is a fine town situated on high ground overlooking the Yamasse river. It has about one hundred houses. I did not stay more than a few minutes in the town, but pushed on.

Hundreds of people turned out to see the white man. They seemed very friendly. Some of the men escorted me on my way and showed the road to Tappoima.

After leaving Gondo the road lay through more hilly, forest country, until some two miles before the Dofa river is reached,

where there is much land under cultivation. The Dofa river is a fine broad stream at this point, and had to be crossed by canoe ("dug-out"). From this river to Tappoima the road is very good and practically level, the land under cultivation increasing in extent the nearer one gets to the town.

At last I was within reach of one of the objects of my tour, viz., the headquarters of the Gola tribe of whom one had heard so much, and for the most part not of a favourable nature. Coming round a bend in the road I saw before me a stockaded town. I was rather taken by surprise, as I had not had any information to lead me to suppose it was fortified. However, I went on, and, after crossing a small stream, ascended a gentle slope to a small gateway in the stockade, through which I passed and entered the town.

My guide led me through the town to a large barri in the centre. Here I sat down and waited while the chief was informed of my arrival. After some little time he came. He shook hands warmly with me in English fashion, and then sat down in his hammock. He is a remarkably fine-looking man and walked with a slow stately step, and has quite an imposing presence. He was a picturesque figure dressed in dark blue clothes consisting of short, loose trousers reaching a little below the knee, a sort of loose under-coat, and over this a large loose flowing robe. On his head he had a small pointed close-fitting cap of the same colour, over which was placed a large broad-brimmed, new and nicely-finished native-made grass hat, about two feet in diameter. Hung over his shoulder by a long knotted leather rope or strap was an ivory-handled sword, which he carried resting on his arm. He came alone, but was soon followed by several of his chief advisers and people of the village, who assembled in and around the barri. I told him that I wanted to get some shooting, and that, if he agreed, I would be glad if he would give me a hunting man to show me the bush (act as guide). He replied this was Liberian Territory and that he was under the Liberian Government. I said I knew that, but they were aware I was coming, as Captain Moore at Da had been informed about me and given me a pass-port. He said he must think the matter over.

I then told him how we had come and how his son did not know the way. He said something to the guide (his son), as I afterwards discovered, to the effect that he ought not to have let me come. The guide replied he could not help it, as I took out my compass and looked at it and then knew the road. The chief then wanted to see the compass and was much interested in it, but was also

rather afraid of it. He also examined my gun and rifle with much interest. He was certainly annoyed with the guide about something, who appeared much frightened in consequence. However, he, the chief, got me a nice house and kitchen for myself and boys and another for the carriers.

The town of Tappoima consists of about seventy houses situated on a hillock. It is clean and well kept and surrounded by a single stockade. On three sides of the town there is a small opening in the stockade about 4 feet 6 inches in height and 2 feet 6 inches broad. Each opening has a thick heavy wooden door. These are the gates of the town and the only means of entry or exit. They are always shut and bolted at night. Except on the east side there are streams within 100 yards of the town. These, after heavy rain, become rushing torrents and flood the surrounding low-lying ground and make approach to, or exit from, the town a matter of considerable difficulty. To the S.W., S., and S.S.E., are forest-covered hills rising 500 to 600 feet above the town and some half-mile distant from it, the interval being under cultivation. To the E., N. and N.W., the country is flat or undulating and covered with low bush for several miles where not under cultivation.

Tappoima is the headquarters of the Gwedji section of the Gola tribe. The paramount chief's name is Tavitadwa. He is the most powerful and influential chief in this part of Liberia, and though nominally only head of the Gwedji section of the tribe, appeared to be recognised by the other sections as their supreme head. He has never been really subdued by the Liberians, and though seeming to recognise their authority to some extent, maintains his independence and administers the Gwedji country on their behalf as commissioner.

The day after my arrival Chief Tavitadwa came to me and questioned me very closely as to why I had come to the country. I informed him that I was fond of travelling about and seeing new places, and that in addition to wanting to shoot I was collecting moths, insects, flies, &c., which made people ill by biting them. I showed him what I had already collected and asked him to allow his people to bring me more. He then wanted to know if I had got leave to come, to which I replied I had, and had got a passport to go where I liked. Also that I had reported to the British and Liberian authorities at Monrovia that I had arrived in Liberia, so that they must know all about it, and if he wished to find out if I was speaking the truth, he could send there to inquire. He seemed

satisfied with this, and I believe that he personally and most of his people were throughout quite friendly towards me. He gave me presents of fowls and rice, and accepted the presents I gave him with much gratitude. He gave me permission to go where I liked and do as I liked, and when my time came to go appeared to be really sorry after he had opened up his country, as he called it, for the white man. Also on parting he presented me with an elephant tail fly-whisk which he was using, saying that so long as I was in his country he would look after me.

On the third day of my stay in the town it was full of men mostly armed with swords, some with guns. I afterwards found out that it was apparently rather a critical period in my existence. The circumstances of the case are as follows :—

The guide, so Tevitadwa told me, was one of his sons, but while in a Vai town he had gambled, and being unable to pay his losses had been seized and sold as a slave for £1. He had got into Besikaia's country, who then arranged an agreement with Tavitadwa for his release and used him as my guide. The fact that I had got to Tappoima and brought him as a guide was apparently displeasing. A meeting was accordingly assembled of all the sub-chiefs and principal men of the country to decide what was to be done. The point at issue being whether I was to be killed or the guide. It was apparently decided that the guide was at fault, and I was assured that he would have been killed had he not been a free-born man. On this ground he was banished from the town for a day or two and then allowed back. My boys also were warned not to go far from the town as they might be killed. There was undoubtedly some trouble as my boys were very nervous, and the guide came to me afterwards and told me what the meeting was about. He was evidently in a great state of fear at the time. I told him that I would make things all right again. I accordingly went about as if nothing had happened, visited and made a point of telling Tavitadwa where I was going, and presented him with a knife, to which he seemed to have taken rather a fancy, some tobacco and cloth. The time, however, was an anxious one, but things gradually quieted down and there was no more trouble.

One night I heard a good deal of noise in the town, so went to see what it was all about. I found that an exhibition of mesmerism or hypnotism was being given, so remained to watch for some time. It was most interesting. The mesmerist was a Gallinas woman and apparently was a great adept at it. I was informed that the "medicine" was a means of finding things which had

been lost. The method of procedure was as follows. The person to be mesmerised stood in a stooping position, knees straight, and with the left hand on the left knee. The right arm was extended at full length and in the hand was placed a small brush of fine grass pointing to and about 3 inches off the ground. The mesmeriser stood in front in a stooping position. With her right hand she smeared some "medicine," which was contained in a wooden bowl beside her, over the ankles, wrists, elbows, and shoulders of the person to be mesmerised, and also on the brush. She then shook the same hand, with forefinger extended, rapidly backwards and forwards just in front of the brush, after having told the other to keep her eye fixed on the finger. While this was going on one of the onlookers rattled a seghura (Mendi musical instrument) and the others clapped their hands simultaneously together repeating the words "Ouay Majjora" in a monotonous and weird chant. After a time the brush, held by the person being mesmerised, began to tremble, then shake, and, finally, to vigorously sweep the ground. The mesmeriser then began to move, at first slowly, being followed by the mesmerised. By degrees they went faster and faster in and out among the houses, or wherever the mesmeriser wished, the mesmerised sweeping the ground as she went, the onlookers following. The mesmerised person was brought round by being suddenly caught hold of and given a shake.

I also saw a woman who did not know how to play the seghura made to play it and run round the town playing it. The method employed was similar to that used in looking for a lost article, except that the seghura was placed in a position ready to be played and the mesmeriser shook her finger in front of the instrument.

While I was at Tappoima, a man of the Berri tribe arrived there. The tribe is a cannibal one; I was informed that it was customary with them to kill and eat someone every time that a new farm or town was started, as well as on other festive occasions.

The trade of the Gwedji district consists chiefly in ivory, rice, and rubber; these articles are exchanged for gin, cloths, ammunition and guns. There is said to be large quantities of rubber in the surrounding forests. I saw some brought in during my stay in the place.

The population of Tappoima, with the exception of a few individuals of neighbouring tribes, was entirely Gola. They were of fine physique and very independent, but good humoured, civil, and obliging. Many of the men carry either a spear or a sword (sometimes both). The Golas do not appear to wear any tribal mark

on the face, as I saw none so marked in any of the towns which I visited. Many of the women are, however, tattooed in black, or rather dark blue, about the arms and body. The Bundu markings of the women and the Poro markings of the men are on the back, but some of the women have markings on the breasts also.

Two days after my arrival at Tappoima (May 4th) I sent off two boys, to Monrovia, to get a few stores and money of which I was in need. They returned on May 12th. As they brought tobacco and some things that I could give to the chief, I determined to leave the next day while all was well. Accordingly, I suggested that the townspeople should have a dance that night. This they did in the chief's barri. I then presented Tavitadwa with several heads of tobacco and some money to distribute.

On May 13th I left Tappoima after bidding farewell to the chief and thanking him for his hospitality and kindness. We passed through or near a considerable amount of cultivation during the first five miles, although the surrounding country was hilly and forest clad. The big-tree forest is then again entered.

On reaching our destination some fifteen miles from Tappoima, my boys built "bush" shelters, and here I remained five days and made long daily excursions into the bush. Near my camp there was a large stream in the pools of which small fish abounded. The boys spent much of their time in catching these with the aid of a bent pin and grains of cooked rice. They were excellent eating and made a welcome change in one's diet.

On May 19th I started off on the march to Monrovia. This I intended to accomplish as quickly as possible, partly not to miss the next boat to England and thereby be delayed for three weeks, but also to avoid being forestalled and held up on the road, should the Golas or any other tribe wish or attempt to prevent my getting through. In this I was successful, covering the distance 95 to 100 miles in four days. The road for the first sixty miles or so lay through hilly forest country, cultivation being met with only in the immediate vicinity of the towns and villages passed through. The hills gradually decreased in height as one approached the coast. During the last forty miles the ground under cultivation steadily increased in extent and the forests correspondingly diminished.

The first town passed through was Yedui after two and a half hours' marching.

At Yedui I saw a prisoner, probably a slave, weaving country cloth. The method of manufacture was different to any I have seen elsewhere. The man sat on a high seat, facing one end of

the length of cloth, instead of on the ground at the side as is usually done. He worked with great rapidity in spite of the fact that he was in stocks. The people were friendly and sold me some eggs.

After a few minutes' halt I pushed on to Bopu, which was reached after a further march of two and a quarter hours.

Bopu is a nice clean town situated at the north-east corner of a plateau about a mile square. Practically the whole of this plateau was under cultivation in cassava. In the distance some three or four miles away and surrounding the plateau, on all sides except to the south-west, were ranges of hills rising to the height of some 1,500 feet. About 200 yards to the south-west of the town were the "barracks." These consisted of some four or five huts, and one large, partially-finished building. Wooden tiles were being used in the construction of its roof and walls. After a halt of a few minutes we went on, although the head man said we could not reach the next town that night, and we did not. During the afternoon a terrific tornado came on, accompanied by torrents of rain. We went on, however, until reaching a small river about 6 o'clock; here I decided to halt for the night; everybody and everything was wet through but the rain had stopped. We got fires lighted and made ourselves as comfortable as was possible under the circumstances, sleeping in the open by the side of the road.

The next day I marched to Gave, which we reached shortly after three in the afternoon. We were eight hours on the road and passed only one small village called Bombamma.

The head man of the village was quite pleased to see me and wanted me to remain there. He was one of those who had been summoned to Tappoima to attend the council of chiefs at which the fate of my guide and myself was discussed. He reminded me that I had given him some tobacco, a fact which I had forgotten, but which had evidently made a favourable impression, as he was most friendly. So I gave him some more. When I said I could not stay, but was going on to Monrovia, he was quite concerned about it and shook his head as much as to say "Better not go."

Gave, also, is a small village like the preceding, situated on a slight rise in the midst of the forest, and surrounded by a couple of acres of ground under rice and cassava cultivation. It has only six huts. These and those at Bombamma and some also at Bopo are rectangular in shape. The walls were made of the central stem of the branches of palm trees, sometimes arranged horizontally and sometimes vertically. No mud was used for plastering the walls.

The roofs were thatched with palm leaves. The huts were evidently intended as permanent structures, but their construction is unusual so far as I know.

Between Bombamma and Gave, stretches of laterite rock began to appear on the surface of the road, and from the latter place, onwards to the coast, this formation became more and more pronounced. Between Bopo and Gave I met only two men on the road.

After leaving Gave the road continued through forest country. No village or town was passed until Beribu was reached after about seven miles march. From this town on the country became more and more populous and cultivated as one proceeded. Between Gave and Beribu I met men carrying loads, presumably ammunition, from the size and apparent weight. These loads were carried on the back, with supporting straps over the shoulders and under the arms, and a band across the forehead, after the manner of the hill coolies in India. This mode of carriage I had not seen used in these parts before, but subsequently I noticed it frequently. The usual method of carrying being, as in Sierra Leone, on the head.

After leaving Buribu I passed through Boila, Bau, Sangi, Boji, and Sobuta, reaching Suhi late in the afternoon. I found the people of these places perfectly willing to sell fowls and rice, had I needed them. Most of the towns appeared prosperous and possessed sheep, goats, and fowls in varying numbers. They were surrounded by cultivation of rice and cassava, and had papaw, banana, and sometimes cocoa-nut trees in and about them. The proportion of Liberians in respect to tribal inhabitants steadily increased. The first place at which I noticed a coffee plantation was Sangi.

Suhi is a clean town and well situated on high ground. The surrounding country is undulating, more or less open and, for the most part, under cultivation with coffee. In fact, from this point down to Bruxesville, it is practically a huge coffee plantation, with patches of high bush and cassava or other cultivation interspersed through it.

The Chief at Suhi received me most hospitably, giving me a well-built house to stay in. He thought I was an American until I informed him I was not. He informed me that there were American warships at Monrovia, and that some of the officers and men had been to Suhi to look at the country. The next morning I left for Monrovia.

The road was good and for the greater part of the way was broad enough for wheeled traffic. I saw one or two carts which

presumably belonged to the coffee estates one passed through. The country became more and more populous as we advanced, and wooden or stone (laterite) built bungalows, roofed generally with corrugated iron, more numerous.

At Bruxesville most of the houses stood in their own compounds. The town is situated on the Brusvil Creek of St. Paul River. On arriving at the "waterside" I hired a canoe, large enough to take my whole party as well as the baggage. The passage of the creek and crossing the St. Paul river took about half an hour on a slack tide. The St. Paul at this point is a fine river about three-quarters of a mile broad with a rather swift current. The feeling in some of the villages passed through as one approached Monrovia was certainly most unfriendly to the British. When the reply "English" was given to an interrogation as to whether I was an American off one of the warships in the bay it was greeted with derision and the greatest contempt and sometimes with hisses. The last two miles of the march were extremely trying, being either along the sea-shore, or a soft sandy road. My carriers were, in spite of their good condition, much fatigued and exhausted by it after the long marches of the previous days. On reaching Vai town I took the ferry and crossed over to Monrovia, landing at the Government Wharf.

On arrival at Monrovia I went to report myself to the British Consul-General (Major Baldwin). He was most kind and hospitable, and arranged for me to be put up at what had formerly been the officers' mess of the Liberian Frontier Force. I told him I had written to him from up country, and also to the Secretary of State for Foreign Affairs, reporting my presence in Liberia. My letter had not reached him. During my two days' stay at Monrovia, waiting for a homeward-bound steamer, I received much kindness and hospitality from the British residents there, especially from Captain Dinnan, Mr. Sharpe (Customs Officer), Mr. Horncastle, of the Bank of British West Africa, and the authorities.

Monrovia is situated on the promontory of Cape Montserado, and consists of residential, business, and native parts. The residential part occupies the high ground in the centre of the promontory. The houses, for the most part, are good buildings of stone (laterite), or wood and stone combined. Each house stands in its own compound. The business part of the town extends along the left bank of the Montserado River, and up the northern slope of the promontory to the residential portion. Here

the streets are narrow and the houses crowded together. Along the bank of the river are several jetties and wharves. The native (not Liberian) part of the town consists of two or more sections. That called Krutown is situated on the south bank of the river, to the seaward or north-west side of the business part, and that known as Vaitown is situated on the right bank of the river, opposite the angle of junction of the Montserado River with a creek (St. Paul River Creek) which runs north to join the St. Paul River. At the mouth of the Montserado River is a bar, over which there is a considerable surf.

The water-supply of Monrovia is obtained from rain water, collected in tanks, and from wells. It appears to be very limited in dry weather, and the quality of a doubtful nature.

The sewage disposal is by the cesspit system. At Krutown I noticed several latrines built out over the river. This may be the case in other parts of the town along the river bank, but I did not notice it.

There is a lighthouse and a signal station near the point and highest part of the promontory.

On the south side the slope to the sea, from the residential part of Monrovia, is very gradual, and the shore is sandy. On the north side the gradient is steep.

On May 25th, 1909, I left Monrovia en route for England. Before leaving, however, I wrote to the Secretary of State for Foreign Affairs (the Hon. H. E. R. Johnson), Liberia, thanking him for the courtesy I had received from Liberian officials during my tour.

LIST OF BLOOD-SUCKING FLIES COLLECTED.

Name.	Locality.
Tabanus secedens (Walk.)...	Sierra Leone and Liberia.
Tabanus kingsleyi (Ricardo)	Sierra Leone and Liberia.
Tabanus sp. ? (near *T. secedens*) (Walk.)...	Sierra Leone.
Tabanus sp. ?	Sierra Leone.
Tabanus arbucklei (Aust.)	Sierra Leone and Liberia.
Tabanus ? form of *T. arbucklei* (Aust.)...	Liberia.
Tabanus argenteus (Surcouf)	Sierra Leone and Liberia.
Tabanus socialis (Walk.)...	Sierra Leone.
Tabanus besti (Surcouf)	Sierra Leone and Liberia.
Tabanus pluto (Walk.)	Liberia.
Tabanus marmoratus (Surcouf)	Sierra Leone and Liberia.
Tabanus fasciatus (Fabri)	Liberia.
Glossina pallicera (Bigot)	Sierra Leone and Liberia.

Name.	Locality.
Glossina palpalis (G. Rob. Desv.) ...	Sierra Leone and Liberia.
Glossina fusca (Walk.)	Sierra Leone and Liberia.
Hæmatopota cordigera (Bigot) ...	Sierra Leone.
Hæmatopota grahamii (Austen) ...	Sierra Leone.

Notes Regarding the Habits of the Flies and the Localities in which they were Found.

Tabanidæ.—Nearly all the specimens were obtained in or near some village or town. These flies seem to prefer places where the "bush" has been cleared, to a greater or less extent, either for cultivation or habitation; probably because there is more sunshine at these places. They were seldom observed in thick or "big" bush where the sun did not penetrate. They do not seem to have any special love for the immediate neighbourhood of water, such as rivers, streams, or swamps, though they are often to be found in these localities, possibly because the sun's rays are more abundant here than in the "bush."

Their flight is very rapid, straight and direct, giving one the impression that they are bent on reaching one particular spot with the least possible delay. If disturbed when resting they fly to another position a short distance off, and are very persistent in returning to the neighbourhood of that on which they first alighted. Their flight is accompanied by a loud buzzing noise.

The bite is sharp, sudden, and painful; the irritation from it lasts several hours. They sometimes bite through clothes: I know this from personal experience, having been bitten through a cotton shirt. I did not identify the species that did this. The natives use bundles of grass, small rushes, or the end of an elephant's tail as whisks to drive off the flies and protect themselves from their bites.

Tabanus secedens (Walk.), *T. kingsleyi*, (Ricardo) and *T. sp.?* (near *T. secedens*, Walk.) were common at most places, especially the two former varieties. On one occasion when halting near a barri (a shed with open sides), in a large patch of cultivation where much decaying vegetable matter was lying about, I noticed hundreds of flies, belonging apparently, for the most part, to these species. This was about 3 o'clock in the afternoon and the sun was shining brightly. The flies showed a much greater inclination to bite when I was under the shade of the barri than out in the open in the sunshine.

Tabanus sp.?—The towns, Gissi and Tungi, where these flies

were obtained are some 60 miles apart but somewhat similarly situated. They are both in hilly, forest country and about 100 to 200 yards from a small river, having much cultivated ground in the near but not immediate vicinity. At Tungi there were sheep and cattle, but at Gissi there were none.

Tabanus arbucklei (Austen).—One specimen obtained was caught in a bungalow, situated 850 feet above sea-level and about a couple of miles from the sea. The bungalow is surrounded by low bush and at the time of year (November) when the specimen was caught there is no running water, except from the water supply taps, within 700 yards of the place.

Tabanus ? (form of *T. arbucklei*) (Austen).—Tappoima, where these specimens were procured, is a town of some seventy houses. There are two streams and much cultivation in the near vicinity. The town itself is moderately clean. There are a few cattle kept in the town.

Tabanus argenteus (Surcouf).—The towns, Dombolo and Gongo, where these specimens were procured, are situated about 100 yards from the Mano River, but at a distance of some 50 miles from each other. Each had some cultivation near it. In both towns the huts were in a bad state of repair, especially at Gongo. The huts are built of mud. Dombolo was moderately clean but Gongo very dirty. At Dombolo there were a few goats and many fowls; at Gongo there were many fowls but no animals of any kind, except one mangy pariah bitch with three unhealthy-looking pups. The people at both places were dirty.

A fakkai, where a specimen was also obtained, consisted of three houses. It was situated some 6 or 7 miles from the nearest village or town and in the midst of big-tree forest. I saw no water anywhere within 400 yards of the place. There were no cattle, sheep, goats, or dogs seen here, but there were a few fowls. There was a little cultivation near the houses and a considerable amount at a distance of some half mile away. The flies here though few in number were most persistent in their attacks, whether one was inside a hut or out in the sun. The time was about mid-day.

Tabanus socialis (Walk.).—Some specimens of this species were caught while feeding on a dead elephant in big-tree forest near a large swamp.

Tabanus besti (Surcouf).—The simbek (a camp) where this specimen was obtained was situated in big-tree forest, in hilly country, and 15 miles from the nearest town or village. A stream 20 feet wide flowed past the camp some 50 yards away. A herd of elephants had recently been in the neighbourhood.

Tabanus pluto (Walk.).—For a description of Gissi and the fakkai where these specimens were caught, see above.

Tabanus marmoratus (Surcouf).—All these specimens were caught in big-tree forest several miles (10 to 15) from any human habitation. There were, however, small, rough, tumble-down shelters which had probably been used, a long time previously, as temporary abodes by travellers or hunting men.

Glossina.—These flies are very quick in their movements, wary, and hard to catch. When disturbed they fly off and then settle again near the place from which they were driven. If disturbed two or three times they disappear, for a time at any rate. They seem to prefer resting in the sunshine on a rock or piece of wood, *e.g.*, the side of a canoe. They do not appear to confine themselves to the immediate neighbourhood of water. Some of the specimens which were caught were obtained, so far as was known, several hundred yards from any water, river, or stream. No cases of sleeping sickness came to my notice, but at one place (Fairo) it was reported to be common. The flies bite through clothes, as I know from personal experience, having been bitten through my socks and khaki trousers by them. I did not, however, identify the varieties that did so. They settle very gently, and the fact that they have done so, unless actually seen, is generally unknown until their bite is felt. The bite is very sharp and gives rise to irritation which may last several days.

Glossina pallicera (Bigot).—The places where these flies were obtained were all towns with some thirty to fifty houses each. They were moderately clean and well kept, especially Fairo and Suji. Much ground was under cultivation round each place. At Bonnatown and Suji there were extensive coffee estates in the neighbourhood. There were sheep in all these towns, a large number at Bonnatown, and cattle also in Fairo and Tappoima. The specimen caught at Bonnatown was caught on a native. At Fairo, Suji, and Bonnatown the specimens were obtained some 200 yards from water. This species appears to be less active in its movements than either *Glossina palpalis* or *fusca*.

Glossina palpalis (Rob. Desv.) and *G. fusca* (Walk.).—These flies were found in many places, being more common perhaps near towns and rivers than in uninhabited bush. Some of both species, however, were procured when feeding on a dead elephant, several miles from any town. Two specimens of the latter species were obtained about 8 p.m. at a camp, at least fifteen miles from the nearest town or village, in big-tree forest.

Hæmatopota.—These flies were found in hilly country covered with big-tree forest and generally some miles from any human habitation. I never saw them in or near any village or town. They appeared to be more common in the Sierra Leone Protectorate than in Liberia, especially in the Gola Forest. They seemed to be especially active and lively from early forenoon till about 2 or 3 p.m., especially if the sun was shining. They did not, however, show any partiality for places to which the sun's rays penetrated through the dense foliage overhead, but rather for those which the sunshine did not reach. They are most persistent and annoying in the way they hover round one's head when marching through those parts of the forest which they frequent. Their flight is rapid, with a slight buzzing noise. They seldom alight for more than a moment and then seem to select the hairy parts of the body, *e.g.*, the scalp or the face where covered by the beard. They alight very gently and are easily disturbed, but not readily driven off entirely. The bite is sharp and painful, but seldom inflicted.

List of Ticks Collected.

Name.	Locality and Remarks.
Amblyomma holloni (Neumann)... ...	Sierra Leone, from a dead elephant.
Amblyomma sp.	Ditto.
Ixodes rasus (Neumann)	Sierra Leone and Liberia, from dogs.
Hæmaphysalis leachi	Sierra Leone and Liberia, from dogs.
Dermacentor circumguttatus (Neumann)	Sierra Leone, from a dead elephant.

My thanks are due to those who assisted me on the spot, and also to a friend at home who kindly put me in communication with the authorities of the British Museum and thus enabled me to collect natural history specimens which it otherwise would have been impossible to do.

I would also express my gratitude to the authorities of the British Museum (Natural History) for their kind and generous assistance in identifying the specimens which were collected. In this connection I would especially thank Mr. L. Fletcher, F.R.S., Dr. S. F. Harman, F.R.S., Sir George Hampson, Mr. W. R. Ogilvie-Grant, Mr. E. E. Austen, Mr. Edgar A. Smith, I.S.O., and Mr. Hirst.

Report.

REPORT OF THE MEDICAL OFFICER TO THE LOCAL GOVERNMENT BOARD FOR 1909-1910.

We are glad to see that this valuable yearly review of sanitary matters has resumed the more portly form to which for many years we had been accustomed. The last two issues have appeared somewhat attenuated. All students of hygiene in this country will welcome the increased size of the present volume.

Dr. Newsholme, in his introductory letter, alludes to recent legislative action in the domain of public health. The possibilities of effective action against infectious disease have been materially increased under the new conditions that now prevail in regard to medical inspection of schools. Health visitors have been appointed by the sanitary authorities in London under the London County Council General Powers Act, 1908. That terrible disease, ophthalmia neonatorum, the most common cause of blindness originating in infancy, has been added to the list of notifiable diseases by fifty-one local authorities, under sanction of the Local Government Board. All cases of pulmonary tuberculosis occurring in any patients attended by Poor Law Medical Officers are compulsorily notifiable; and under that Order sanitary authorities are empowered to take measures for cleansing and disinfection, the safe disposal or destruction of infectious material, and for helping the patient in any way which will tend to prevent the spread of infection. In addition, the Medical Officer points out that sanitary authorities should arrange for the treatment of such cases as are not destitute in any suitable hospital that may be available; that District Councils have power to provide sanatorium treatment for both early and advanced cases, and may also make provision for open-air treatment, where such is desirable. In many places empty small-pox wards, or empty wards of isolation hospitals are being used for this purpose. It is evident that the Board intend to stimulate local authorities to make a decided advance in the crusade against consumption; it is now the disease against which it behoves all sanitarians, and not least those in military service, to make a determined attack.

Dr. Newsholme also emphasizes some points in his Report (published separately) on infant and child mortality, such as, that excessive *infant* mortality implies excessive *child* mortality, and excessive mortality right up to *adult* age. As each sanitary authority succeeds in removing the conditions that favour high infant mortality, they also remove the conditions that produce a high mortality in youth and throughout adult life. The mean infant mortality throughout England and Wales is 157 per 1,000

births, in certain selected healthy districts it is only 109. In regard to vaccination, the percentage of infants vaccinated has fallen to 63·2, leaving 27·9 that are either "exempted," "postponed," or "remaining"; this is a reduction of 7·7 in the proportion vaccinated, which is now lower than in any year since 1898.

A new feature in this year's report is an account of the occurrence of epidemic diseases in England and Wales, during 1909, by Dr. Parsons. The death-rate per 1,000 for the "principal epidemic diseases" was 1·12, compared with 1·56 for the five years, 1904-1908, and 1·91 for the five years, 1899-1903. A reduction took place in scarlet fever, diphtheria, whooping cough, "fever," and diarrhœa; only in measles was there a slight increase from 0·33 in 1899-1903, and 0·31 in the next five years, to 0·35 in 1909. Dr. Parsons notes that measles is especially a disease of urban districts. For the seventy-six great towns in 1909 the death-rate was 0·48, for the rest of England and Wales only 0·21 per 1,000. This is not because the improvements in housing, &c., during the last sixty years have had no effect on it, but because they have been to a great extent neutralised by the progressive urbanisation of the population. In towns an epidemic tends to recur every two or three years, while in villages ten or twenty years may pass between one epidemic and another. As proneness to attack and case-mortality are greatest under five years, and especially in the second year of life, in a large urban working-class population almost every child has to run the risk of infection, when it is liable to attack (and a fatal issue); while in the country a large number pass through the susceptible ages without exposure to infection.

In the notification towns there has been a considerable reduction in enteric fever (from 0·57 per 1,000 in 1905 to 0·37 in 1909), but no diminution in the cases of scarlet fever or diphtheria during these years. Since the passing of the Public Health Act in 1872, however, there has been, as regards scarlet fever, an immense improvement; in 1861-70 the death-rate was 0·97, in 1901-09 it was only 0·11, in 1909 it was 0·09. This reduction has been due rather to the milder character of the disease than to a diminution in its prevalence. This mildness of type tends to makes its prevention more difficult, as the very slight cases escape detection and spread the disease. Occasionally there is an increase in virulence. In May, 1909, a severe outbreak occurred at Portland; there were 23 cases and 11 deaths, all among children attending a particular school; it was suggested by the medical officer that the severity of the outbreak was due to the fact that the particular school area affected had not experienced the immunising effects of repeated epidemics; it is also noted that in over 50 per cent. of the cases there was no history of scarlet fever in either parent. The type of disease which has been prevalent during the last ten years in the district (but not in this particular area) has been very mild. The circumstances, as related, are interesting from an epidemiological standpoint. Several milk epidemics of scarlet fever

are mentioned; one of well-marked character in Surrey was very promptly checked by the energetic action of the local health authority and the purveyor of the milk. Several cases occurred on June 15th; on June 18th the milk supply was stopped: the outbreak was over by the end of the month. A number of the cows supplying the milk had sores on the teats; the milk of two recently-calved heifers came into use for the first time when the milk became infectious, and from material taken from the teats of the infected cows two types of streptococcus were isolated by Dr. Gordon, one resembling *Streptococcus anginosus* of Andrewes and Horder, the other *S. mastitidis* of Savage. Another kind of infection caused an outbreak at Malton, Yorkshire. Of fifty-six children, forty-eight partook of the infected milk, and twenty-five were attacked with scarlet fever within three to five days; this was in July. There was no fever in the neighbourhood at the time, but there had been a case at the farm in April. The patient left the farm four days before the school treat. The milk that conveyed the infection was skim milk, and had been stored for some hours; a pail of new whole milk from the same source produced no ill-effects.

The death-rate from *diphtheria* (0·14 per 1,000) was the lowest since 1881: the average for 1899-1903 was 0·25, and for 1904-08, 0·16 per 1,000. This reduction is due (like that of scarlet fever) to diminished case-mortality (fatality) more than to lessened prevalence: the improvement results from improvement in the methods of diagnosis, and from the employment of the antitoxin treatment. No epidemic of any magnitude was recorded in 1909. A small outbreak due to milk was reported at Nantwich: five persons in four different houses were taken ill almost simultaneously, all getting their milk from the same farm: here the bailiff and a boy, both habitually in contact with the milk supply, were found suffering from sore throats: the diphtheria bacillus was detected in each case. A singular outbreak occurred at a girls' school near Bath, in February and March. There had previously been cases of "influenza"; in February the number of cases increased, the character of the illness changed, and it did not respond to treatment. A nasal swab showed the presence of diphtheria bacilli. Swabs were then taken from all the girls in the school, 123 in number: twenty-four gave positive, thirty-five negative, results; and sixty-four contained pseudo-diphtheria bacilli. Only sixteen were really ill, and only three had genuine clinical diphtheria: "some of those harbouring diphtheria bacilli had no other sign of illness": it is perhaps permissible to say that they had no sign of illness at all: but they might have been capable of spreading the disease. Two days before the outbreak, a girl, who had had "influenza," returned to school from a town in which nasal diphtheria was said to be present; but in her case bacteriological examination gave a negative result. This outbreak seems to be a good example of the view that *soil* is of as much importance as *seed* in disease propagation as in agriculture; and shows how true it is

that one man may steal a horse, but another may not look over the hedge.

The mortality from *enteric fever* has declined in recent years from 0·33 per 1,000 in 1871-80, to 0·20 in 1881-90, 0·17 in 1891-1900, and 0·10 in 1901-08: in 1909 the uncorrected death-rate for "fever," including typhus, enteric and other continued fevers, was only 0·06. This appears to have been due to a lessened number of cases, not to a lessened fatality among those that do occur. No outbreaks of any magnitude were reported in 1909. *Smallpox* was introduced into the country from Egypt, Algiers and Russia, but in no case spread to any important extent.

Besides the usual *résumé* of the chief facts elicited in sanitary inspections throughout the country, the reports on enteric fever in the county of Durham, by Dr. Wheaton; in the districts of Bradfield and Ormesby, by Dr. Johnstone; and at Brackley, by Dr. Fletcher, are reproduced in full. Dr. Wheaton's report is entitled "preliminary": it is a general survey of the incidence of enteric fever in Durham, without entering into particulars: it establishes the general conclusion that the great excess of the disease in this county, as compared with England and Wales, was almost confined to the urban districts (*ex*cluding the county and municipal boroughs) and to the rural districts; and associates the prevalence of the disease with the almost universal use of privies and the neglect of scavenging. Dr. Johnstone relates the circumstances of enteric prevalence at Jennett Hill in Berkshire, due to carrier infection; and at Ormesby, near Middlesbrough, due apparently, partly to shellfish, and partly to dissemination by privy middens.

Dr. G. S. Buchanan's report on the work of Inspectors of Foods contains many points of interest, and shows to what a degree of specialisation this branch of public health administration has now attained. The total amount of beef and mutton, fresh, chilled and frozen, imported into the kingdom in 1909, amounted to very nearly eleven million hundredweight: this mostly comes from America, Australia and New Zealand, a small proportion arriving from the continent of Europe. As to a consignment of beef from Antwerp, in which twenty-one sides were found to be conspicuously affected with tuberculosis, it is unpleasant to find that after a shipment of Danish cattle had been rejected at the German frontier on application of the tuberculin test, they were shipped to Antwerp for slaughter and the carcases thence brought to Harwich. This circumstance would very naturally make one suspicious of *all* carcases arriving from Antwerp. With regard to pork carcases, the Board have obtained an assurance from the Belgian Government that a special officer would be appointed to report upon the hygienic conditions of the establishments in Belgium where pork is prepared for export; and special instructions provide for rejection of all pigs found to be suffering from tuberculosis. Dr. Buchanan says that competent examination at the place of slaughter must always furnish a more satisfactory means of detecting disease in

meat than can be afforded by the inspection of the dressed carcase; with this statement everyone will agree. In view of the immense trade in imported food that is now carried on, the work of this department of food inspection is of the highest importance to all classes. Formaldehyde has been used as an aid to the preservation of refrigerated carcase meat from South America; Dr. Schryver found that though thorough roasting or boiling removed or diminished the formaldehyde, grilling did not have this effect; also that this disinfectant was still present in cooked sausages made from the meat in the ordinary way. On representations being made, the importers undertook to amend matters: there is need for great watchfulness. In fact, in the department of food inspection, the conditions seem to approximate to those of a game of skill, or contest of wits, between the purveyor on the one side and the inspector on the other, new methods continually being devised to make a thing appear that which it is not. A new and interesting process is that of "re-constructing milk," lately carried out in an establishment near London, and said to be in considerable vogue in some American cities. The milk is separated, concentrated, and reduced to about one-fifth of the original volume; the cream is exposed for about an hour to similar treatment; the two articles are then despatched to a town depot, where they are mixed in any desired proportions with boiled tap-water, and distributed in bulk or in bottles. It is claimed that this "re-constructed milk" always contains at least 3·25 per cent. of fat. This was found to be the case in several samples analysed; also it was found that the natural enzymes of raw milk (which are destroyed in Pasteurisation) are retained in this process. Bacteriological tests did not, however, confirm the claim that the process could be relied upon to free the milk from pathogenic bacteria. Though the reconstructed milk was found to resemble an ordinary raw milk of reasonable cleanliness most people will agree with Dr. Buchanan's opinion that milk prepared by this process should be sold "as a prepared milk." We know that the cow, as a purveyor of food, has many weak points; and any physiological expert, perhaps even Macaulay's schoolboy, could devise a more scientific food than milk taken at random from an ordinary cow: nevertheless, there are possibilities of risk even in the most carefully-designed improvements upon Nature; many would still prefer the natural article (heated sufficiently to destroy pathogenic germs), somewhat on the principle that Lord Derby "preferred the gout." The adulteration of margarine with paraffin, the facing of rice with steatite, and contamination of canned fruit by exposure of solder, are other points dealt with by Dr. Buchanan, who also summarises the leading regulations as to food inspection and adulteration that have been made by foreign countries and British Colonies during the past year.

Dr. Blaxall reports that the percentage success of vaccination with glycerinated calf-lymph issued from the Government establishment was, in primary cases, 99·4 for the cases, and 95·9 for the insertions; in re-

vaccinations the percentages were 97·6 and 94·3 respectively. The appendix contains a lengthy memoir, by Dr. J. C. Ledingham, on the "Enteric Fever Carrier." Dr. F. W. Andrewes contributes a further report on "Leucocytes and the Changes in Bone Marrow in relation to Infection by Pyogenic Cocci and other Bacteria." Dr. W. G. Savage reports on "Gaertner Bacilli in prepared Meats," and on "The Bacterial Measurement of Milk Pollution." Amongst other papers is one on the "Chemical Purification of Chalk Waters," by Mr. C. G. Moor and Professor Hewlett. This volume is second to none of its predecessors in interest and value.

A. M. D.

Reviews.

WOUNDS IN WAR, THE MECHANISM OF THEIR PRODUCTION AND THEIR TREATMENT. By Colonel W. F. Stevenson, C.B., K.H.S., late Professor of Military Surgery, Royal Army Medical College, London. Pp. 553. Longmans, Green, and Co. 16s. net.

Colonel Stevenson has presented us with the third edition of his work. This was a real necessity, as since the writing of the second edition very important changes have taken place in military surgery, changes due to the lessons taught by the late Boer War and the Russo-Japanese War in Manchuria, and to the result of recent discoveries in the science of surgery itself. The work is divided into fifteen chapters.

Chapter I., commencing with some introductory remarks, deals with the subject of gunshot wounds in general, and enters fully into the mechanics of projectiles. At the end of the chapter will be found a table showing the characteristics of the breech-loading magazine rifles of the chief countries.

The next chapter gives the peculiarities of injuries produced by projectiles. The writer shows how misleading the old experiments on dead animals and cadavers with the new rifle and bullet were, the late wars having shown that the appalling destruction seen in the experiments is not met with when men are hit by the bullets under ordinary circumstances. The true cause of the explosive effect of the modern small-bore bullet is explained and the old idea of the burning effect of bullets is abandoned.

In describing generally the treatment of wounds in war, the writer pays fitting tribute to Listerism, but we have not the author's faith in iodoform and boracic acid, which he terms "powerful inhibitors of bacterial growth."

In discussing gunshot wounds of joints the author points out that the introduction of the modern small-bore bullet has had the happy result of permitting these injuries to be treated by conservative surgery instead of by amputation as formerly.

The author advocates the use of a 1—20 solution of carbolic acid, or a 1—500 corrosive sublimate for washing out joints in which sup-

puration has occurred; we think these solutions too strong, and consider sterile normal saline solution or very weak antiseptics, especially if combined with Bier's hyperæmic method, more in keeping with modern views.

Gunshot wounds of the head and spine are well described in Chapter IX., and cases are quoted exemplifying various conditions resulting from these injuries.

When discussing wounds and injuries of the chest we notice that the author apparently advocates irrigation of the pleural cavity as a routine practice. This is not advisable except when the contents of the empyema are very foul, and even in this condition a freer incision to obtain better drainage is usually sufficient.

Chapter XI. deals with wounds and injuries of the abdomen and clears up doubts which have existed up till quite recently as to the best method of treating these cases in the field.

At the end of Chapter XIV. is given a short account of "The Field Ambulance." We notice some old titles mentioned in the text, such as Field Hospital, the Principal Medical Officer of the Division, Collecting Station; these should have been given their new designations. There are also a few inaccuracies in the composition of a field ambulance.

Chapter XV., the closing one, gives a short account of the Geneva Convention, 1906.

The work is well illustrated, there being 32 illustrations, including many excellent skiagrams of fractures. The book is well printed and has a good index. We heartily congratulate Colonel Stevenson on the way in which he has brought this edition up to date, and we wish it every success; he deserves the thanks of the surgical world for the trouble he has taken in putting together, from so many sources, the most reliable information on the subject.

C. B. L.

THE DISEASES OF CHINA, INCLUDING FORMOSA AND KOREA. By W. Hamilton Jefferys, A.M., M.D., University of Pennsylvania, and James L. Maxwell, M.D., London. London: Bale, Sons and Danielsson, Ltd., 1910. Pp. xvi. and 716. 8vo. Price 25s. net.

This book, as the author's preface proclaims, is not an exhaustive treatise on all diseases met with in the countries with which it deals, but is an account of special diseases met with among the native populations, and it contains, in addition, much general information of value to a medical man whose work lies in the Far East.

It is written by two medical missionaries who, besides having had especially good opportunities of personal observation, have collected information about and statistics upon diseases met with over a vary large tract of country, practically the whole coast line from Pakhoi to Chemulpo, including the islands of Haînan and Formosa, the Yangtse Valley, which extends from west to east through the centre of China, and the Southern Frontier line; an area roughly speaking of about 2,000 miles square.

It opens with a chapter upon the "The Conditions of Practice in China," describing the Chinese empirical methods, and modern scientific practice, medical education, and the proclivities of the Chinese patient; followed by a chapter upon "Nosogeography and Nosology," which is important. The whole range of medicine, surgery, and gynæcology is

visited, the chapter upon "Leprosy and Beri-beri, Diseases of the Skin, and Syphilis and Venereal Diseases" being particularly interesting. The book concludes with chapters upon "Hygiene among the Chinese," "Hospitals and Hospital Construction," and an appendix giving laboratory methods for disease investigation.

It is well and fully illustrated, and contains many anecdotes which form padding for a great deal of scientific information The work is essentially a guide to practice among the native populations and a record of the experience of practitioners in China in recent years.

The intelligence of the Chinese, their increasing importance as a nation, and the little that is known by Europeans as to their internal affairs make such a work as this of interest, apart from its value to science. It is vivaciously written and up to date, and seems to be a distinctly valuable contribution to the literature of exotic diseases.

The nosogeographical charts, the nosological tables and the tabulated records of infectious disease, opium smoking, lithotomy results, &c., represent tangible facts; the photographs of morbid conditions, besides being instructive, give a graphic idea of the advanced state in which disease is often seen in countries where medical science and surgical art are unknown. This work should certainly be known to any medical officer proceeding to the Straits Settlements or to China.

H. E. R. J.

THE TREATMENT OF SYPHILIS BY THE EHRLICH-HATA REMEDY—"606." A COMPILATION OF THE PUBLISHED OBSERVATIONS. By Dr. Johannes Bresler. Second Edition, much enlarged, translated by Dr. M. D. Eder, with an abstract of the most recent papers. London: Rebman Ltd. Pp. xii. and 122. Price 2s. 6d.

It is a testimony to the extraordinary interest which "606" has aroused that the authors of this work should have thought it desirable to publish in book form abstracts of the more important of the multitude of papers which have been written on the subject since March last year. The abstracts are given in chronological order, commencing with that of Alt's paper, in which the remedy was described and an account given of the first trials of "606" on man. Dr. Bresler's part of the compilation ceases with Iversen's paper of August 16th, but the translator's appendix includes articles published in English and other medical journals up to October 8th.

We must confess ourselves in some perplexity as to the particular want this work is intended by the authors to meet. It contains numerous abstracts of cases in which "606" has been administered and thus affords the busy practitioner a means of rapidly gaining a general idea of the widely varying manifestations of syphilis in which this remedy has been successful and, to a certain extent, of those in which it has failed. In addition to case records, however, a number of the abstracts contain details of the various methods which have been employed by different workers of preparing the drug for administration, and it is possible that the reader may be led to use this book for his guidance in this important branch of the subject; on this account, some criticism is necessary. In some cases the details of technique have been faithfully given, but in others they are misleading. In the description of one of the most generally used methods of preparing "606" for injection—that of Wechsel-

mann and Lange—which is given on p. 48, we are told that, after dissolving in sodium hydrate solution, "egg-albumin is added, drop by drop. . . ." Probably the difficulty of this operation will drive the reader to consult the original paper, when he will be relieved to find that glacial acetic acid (Eisessig) is used in this place. The description of Iversen's technique, which is given on p. 94, may easily give rise to some misunderstanding as to the method he employs when preparing the drug for intravenous injection. The instructions contained in the abstract run as follows: "The clear solution is diluted with distilled water to a strength of 1 per cent., and then injected. A prior injection of novocaine lessens the pain considerably. Iversen first injects 0·4 to 0·5 gramme intravenously, and forty-eight hours later 0·3 to 0·4 gramme intramuscularly." In the absence of any remark to the effect that Iversen makes up the amount to at least 250 cc. when giving an intravenous injection (*Münch. med. Woch.*, August 16th, 1910), it appears to us that the reader who relies on this abstract for his guidance is apt to commit the highly dangerous mistake of giving a 1 per cent. solution intravenously. In the translator's appendix (p. 114) Schreiber's recent paper on the intravenous injection of "606" is mentioned, but the fact that Schreiber makes a point of having discarded the use of methyl-alcohol in preparing the solution is ignored, an omission which may be important in view of the fact that Guth has stated that methyl-alcohol is capable of causing blindness in susceptible persons. It would have given the reader a clearer idea of the principles to be observed in administering "606" if Ehrlich's reasons for recommending the intravenous route had been given, viz., the uncertainty of absorption of the remedy when an intramuscular injection is given, the possibility of decomposition of the drug in the depot so formed, and the necessity for assailing the parasite with a large initial dose. Dr. Bresler remarks in his preface that the reader is left to form his own judgment. For our part, we cannot see how, at this stage, the reader's judgment is any more assisted by a study of this book than by following the excellent articles on the subject which are constantly appearing in the English and other medical periodicals.

L. W. H.

MEDICAL DIAGNOSIS. By W. Mitchell Stevens. London: H. K. Lewis, 1910. Pp. xl. and 1571. Price 25s. net.

This is a book of reference for the practitioner to consult when he is faced with one of the frequent difficulties in diagnosis which are met with in practice. It is divided into sections, starting with one on general symptoms and general physical signs; this is followed by a section on infectious diseases, and after that come sections on the various groups of diseases, heart, lungs, &c. Each section commences with a discussion on the symptoms, physical signs and methods of examination proper to the group of diseases dealt with, and then each disease of the group is taken up in the greatest possible detail as to symptoms, differential diagnosis and possible complications. The book represents the results of an enormous amount of labour; it is packed full from end to end with information, almost in note-book form. For reference in difficulties and as a help to the more thorough investigation of one's cases it should be invaluable.

W. S. H.

MILITARY LAW MADE EASY. By Lieutenant-Colonel S. T. Banning. London: Gale and Polden, Ltd. Fifth Edition. Pp. xiv. and 356. Price 4s. 6d. net.

Former editions of this work are too well-known and appreciated to require any special recommendation of the present edition, which has been brought thoroughly up to date.

To officers and others commencing the study of military law this book should be of the greatest assistance.

G. G. D.

Current Literature.

Epidemic Diarrhœa. O. H. Peters (*Journal of Hygiene*, December, 1910, vol. x., No. 4).—The following is a general outline of the chief conclusions arrived at:—

"(1) AGE INCIDENCE, PREVALENCE AND FATALITY, &C.

"(*a*) *The age incidence* of the mortality and morbidity differ markedly, and it is interesting to note that so many differences exist in the disease, as studied from the latter two standpoints, that separate recognition like that accorded to two different affections is almost justified.

"(*b*) *Prevalence and Fatality.*—In some Midland towns the disease is a veritable scourge; 10 per cent. of the population may be attacked during the season; the cases may number a hundred times the total of deaths.

"(2) CLINICAL FEATURES, IMMUNITY, &C.

"The clinical picture of the disease was not always complete, but association with other cases generally served to confirm the diagnosis.

"The incubation period was often found to be from six to thirty hours in length, possibly it is sometimes longer.

"The duration of attack and tendency to recurrence varied directly with the age, *i.e.*, with the susceptibility of the patient. There is probably a moderate amount of acquired immunity.

"The mortality, which is almost confined to infants, is determined to a striking extent by previous ill-health of the patient.

"(3) SOCIAL RELATIONS.

"Occupation was not found to produce any effect upon the incidence of the disease, except by the possible influence of the close association of the men at their work.

"School attendance probably has little effect on the spread of infection, owing to the small susceptibility of those of school age.

"The sharing of yards in common apparently had a marked influence upon the spread, or limitation, of infection.

"(4) SANITATION.

"Dirtiness of the household increases the incidence of the disease, probably through carelessness in dealing with the excreta, particularly of young children (*cf.* Conclusions, pp. 653-657).

"The provision of water-closets, good drains, refuse receptacles, and yard paving, is in all cases of no avail where dirty and careless habits exist.

"The question of W.C. *versus* pan-closet is, moreover, probably only of minor importance, fæcal infection having most to do with pollution of the interior of the household by young children of more mature years.

"(5) FOOD.

"(*a*) *Human and Cow's Milk in Infant Feeding.*—The comparatively low incidence upon the first year of life appeared to be due to breast-feeding. With the substitution of cow's milk in the second year the maximum incidence is attained. Boiling the cow's milk gave no protection.

"(*b*) *The Milk supply* apparently plays no part, unless one of a general kind, in introducing diarrhœa into the home (*cf.* Conclusions, p. 682).

"(*c*) *Infection within the home* is probably the commonest method of contracting the disease. Much infection is frequently contracted where milk is altogether excluded from the dietary (*cf.* Conclusions, p. 682).

"(*d*) *Solid Foods.*—It is possible that, all other things being equal, no one kind of food is more likely to be a vehicle of infection than another.

"(6) EPIDEMIOLOGICAL FEATURES.

"(*a*) *Personal Infection, Direct Personal Infection, Fly Carriage, Ground Infection, &c.*—It appeared not improbable that the phenomena of diarrhœa prevalence are almost wholly concerned with the local evolution of various infective foci, and a piled-up mass of evidence has been presented as to the bulk of infection being derived by transmission from person to person. Further, as regards the above four sources or methods of infection, a great deal of evidence was obtained for, and none against the first three, and practically none was found exclusively supporting the last (*cf.* Conclusions, p. 715 *et seq.*).

"(*b*) *Factors governing Epidemic Rise and Decline.*—In relation to both the temperature and fly curves the diarrhœa curve shows: a delayed rise, variations corresponding with their variations, and a definite falling away from their declining curves. The explosive form of the curve suggests multiplication by case-to-case infection, with gradual exhaustion of epidemic potential. The correspondence of the diarrhœa and fly curves are such as to be quite compatible with the theory of fly infection. Direct evidence, derived from the performance of certain crucial tests is, however, necessary, before practical adoption of the latter theory is warranted (*cf.* Conclusions, p. 743 *et seq.*).

"(7) PREVENTION AND TREATMENT.

"*Treatment.*—Much might be expected from a remedy such as an effective antitoxin or antibacterial serum.

"*Prevention.*—There is good reason for believing that a great deal can be accomplished by the following preventive measures:—

"(*a*) *Notification of Diarrhœa Sickness.*—Notification, of a partial kind, is shown to be practicable and useful.

"(*b*) *Isolation of attacked Persons.*—Generally practicable to some slight extent.

"(*c*) *Cleanliness in the Household.*—Particularly with regard to avoidance, or cleanly removal, of fæcal diarrhœal pollution.

"(*d*) *Education of the Public* as to the specific nature and infectiousness of the disease; as to infection through stools, &c.

"(*e*) *Breast-feeding* wherever possible, *and proper care of food*, failing, the wet nurse should be procured, or a cow or goat obtained; or again in default, only milk newly drawn and given unboiled. No reliance to be placed on boiling stale milk, *i.e.*, milk which has lost its first freshness; *such milk is better not given at all.*

"(*f*) *General sanitary measures* should be attended to, but however complete their provision, diarrhœa may rage with undiminished violence where their beneficial influence is neutralised by: (i.) Dirty and careless habits of living, including carelessness with food; (ii.) want of care in isolation of attacked persons, and in the handling and exposure of their stools.

"It is not sufficient to merely establish good water-closets, drains, &c.; in dirty districts supervision as to their cleanly working is absolutely necessary.

"A demonstration of fly carriage would call for destruction of fly-breeding grounds, and for precautions against exposure of infective discharges, as well as of food."

The New Organisation of the French Army Medical Service in the Field. By Méd.-Major Cousergue, au Ministère de la Guerre, *Archives de Méd. et Pharmacie Militaires*, December, 1910.—The new regulations were signed by the President of the Republic on April 26th, 1910. Cousergue in his article first reviews the former field medical organisation and then proceeds to give a *précis* of the new arrangements, from which the following extract has been taken:—

The regimental medical service is directed to form small shelters for wounded behind any natural protection; wounded who are unable to get to these points by themselves are to be carried there by the regimental stretcher-bearers as opportunity offers. Here they will receive first-aid assistance and will then be carried or directed to proceed to the rear, when it is safe to do so.

The former ambulances and field hospitals have been abolished and replaced by more lightly equipped interchangeable units capable of accompanying the troops, or if immobilised of treating the wounded they have taken in.

The new units are ambulances and hospital sections.

An ambulance has the following *personnel* and transport:—

One médecin-major (surgeon-major) mounted; 5 médecins-aides majors (surgeon-captains), 1 mounted; 1 pharmacien aide-major (pharmacist-

lieutenant); 1 officier d'administration gestionnaire (quartermaster); 1 officier d'approvisionnement (supply officer), mounted; 38 hospital orderlies (includes 2 serjeants and 4 corporals); 12 men of the "train" (includes 1 serjeant and 1 corporal); 19 horses; 1 omnibus for non-mounted *personnel*; 5 medical stores or general service wagons, 2 of these are tortoise tent wagons.

The hospital section consists of: 4 medical orderlies (1 is a corporal); 4 men of the "train" (1 is a mounted corporal); 7 horses; 3 wagons.

The command of the groups of hospital sections held in reserve is vested in a mounted "officier d'administration," the "chef du groupe," assisted by 2 serjeants of the medical corps.

Each division forming part of an army corps has 4 ambulances and 3 hospital sections; these units are divided between the first line transport of the division, the first line transport of the army corps and the group of supply parks. There is a special cavalry ambulance for each cavalry division, but not for a brigade of cavalry.

In addition, each army corps has 8 ambulances and 6 hospital sections without transport; these are kept in reserve at the advanced base. A new formation, the bearer company (groupe de brancardiers) maintains the connection between the regimental medical service and the medical units. Its duty is to remove the wounded from the regimental aid-posts to the ambulances, or ambulance trains, or road convoys, if the two latter have been able to approach the scene of the fight. If the regimental bearers have not finished collecting the wounded the bearer company will assist them.

There is a bearer company for each division, and in addition one to each army corps. The latter contains a hygiene section equipped with *personnel* and *matériel* for the purpose of undertaking chemical and bacteriological examinations, as well as disinfection.

The divisional bearer company is divisible into 2 sections and has the following establishment:—

One médecin-major (mounted); 1 médecin-aide-major (mounted); 2 officiers d'administration (mounted); 1 officier du train (mounted); 4 médecins auxiliaires; 152 bearers (includes 6 N.C.O.'s); 61 men of the "train" (includes 5 mounted N.C.O.'s); 75 horses or mules; 2 1-horse medical carts; 6 1-horse ambulance carts; 5 2-horse ambulance wagons; 2 medical stores wagons; 2 supply wagons; 2 general service wagons; 1 smithy, travelling forge; 1 wheeled kitchen.

The army corps bearer company has the following composition:—

One médecin-major 1re classe (mounted); 1 médecin-major 2me classe, as bacteriologist (mounted); 1 médecin-aide-major (mounted); 2 officiers d'administration (mounted); 1 officier du train (mounted); 1 veterinary officier (mounted); 4 ministers of religion; 6 médecins auxiliaires; 234 bearers (includes 10 N.C.O.'s); 81 men of the "train" (includes 6 mounted N.C.O.'s); 96 horses or mules; 2 1-horse medical carts; 8 1-horse ambulance carts; 6 2-horse ambulance wagons; 3 medical stores wagons; 2 supply wagons; 3 general service wagons; 1 travelling forge; 1 wheeled kitchen.

During an engagement the ambulances attached to divisions receive the wounded treated by the regimental medical service and brought in by the bearer company.

When fighting is finished a certain number of the ambulances will be immobilised for the purpose of treating such wounded as are unfit for removal; a hospital section will be attached to each of them.

Units which have become immobile will be immediately replaced by a corresponding unit from the next échelon (first line transport of army corps); this unit will in turn be replaced by one from the park échelon. The immobile units will hand over their transport to the units which take their place.

The evacuation hospital will carry out the duty of evacuating sick and wounded as in the former organisation, but will not now have to act as an advanced dépôt for medical and surgical supplies. It is divisible into two sections and has the following compositions:—

1 médecin major 1re classe (mounted); 1 médecin major 2me classe (mounted); 6 médecins aides-majors; 2 pharmaciens; 2 officiers d'administration; 52 orderlies, 4 of whom are N.C.O.'s; 1 orderly from the "train."

Its matériel is about the same as that of two ambulances and two hospital sections combined. There are, however, more stretchers (200), supports for bed-stretchers (40) and apparatus for the adaptation of requisitioned vehicles (100). It has also sufficient matériel to fit up four improvised ambulance trains, which are administered as auxiliary portions of the evacuation hospital and are kept at the advanced base until required.

The replenishment of medical and surgical supplies has been reorganised. At the advanced base (gare régulatrice) an advanced depot is established which in turn draws on the base depots and through these on the depots in the country.

Every day a certain quantity of surgical material is sent from the advanced depot to the point of contact between the lines of communication and the army at the front (centre de ravitaillement) at the same time as the daily supplies.

The senior medical officers of units send a voucher for any surgical material they may require and a requisition for medicines or other articles to the "centre de ravitaillement." Dressings are issued in exchange for the voucher; requisitions for other articles are forwarded to the issuing officer at the advanced base, who has them sent up by the first available convoy.

The senior medical officer of each medical unit now has the same disciplinary powers as the commandant of a detached unit of similar rank over all the *personnel* which forms part of his unit, irrespective of the corps to which the men belong.

The medical and surgical equipment will in future be packed in panniers, boxes and bales so as to be easily available. Thus there will be a medical pannier containing drugs and articles likely to be constantly required (No. 2); a supplementary medical pannier (No. 12); surgical dressings panniers (Nos. 3, 4 and 5); a pannier containing articles for washing patients (No. 8); an instrument pannier (No. 10): a plaster of Paris pannier (No. 11), &c.

The supply of surgical instruments and drugs has been brought up to date; obsolete articles have been discarded and many new ones added. The drugs have been supplied in tubes, and in tabloid form. The dressings

are ready cut in three sizes. Portable X-ray apparatus and water sterilisers are assigned to the advanced base ready to be sent on when required. C. E. P.

New Dental Regulations in the French Army.—("La Stomatologie dans l'armée," *La France Militaire*, December 21st, 1910).

(1) In each military hospital a dental clinique will be established for the officers, non-commissioned officers and men of the army, as far as funds will permit. In these cliniques only necessary work will be carried out, *e.g.*, removal of tartar, extractions and fillings with amalgam or cement.

(2) The principal medical officer of each army corps will decide in which hospitals dental cliniques are to be established.

(3) The work will be carried out by enlisted soldiers who are qualified dentists or who are advanced students of dentistry. They will be under the direction of the senior medical officer.

(4) A list of instruments and equipment to be supplied to each clinique is given. C. E. P.

Preliminary Military Training for Youths in Austria. By Captain Wollinger (*Streffleur's Zeitschr.*, January and November, 1910). —Austria contemplates reducing the period of service in the army to two years. To compensate for this diminished period of training it is considered necessary that the bulk of the recruits on joining should as far as possible have some preliminary training. During 1909 the Minister of Education held a prolonged inquiry into the best means of dealing with this question. The conclusions come to were that efforts should be made to prepare all male youths for military service by providing:—

(1) Physical education of older school boys.

(2) Instruction in shooting for boys in the last two years of school life.

(3) The establishment of boys' clubs.

As regards (1) it is definitely laid down that at least two hours a week should be devoted to outdoor exercises, to games and sports of all kinds; this is in addition to two hours at gymnastics weekly.

As regards (2) a programme for the instruction in musketry has now been issued. This is to take place on Saturday afternoons; each day's instruction is to be of at least two hours' duration, and it is considered that fifty hours should be available during the year. The musketry course will include the following subjects:

(*a*) Elementary instruction in the theory of musketry.

(*b*) Shooting with a miniature rifle.

(*c*) Shooting with a full-size rifle at targets.

(*d*) Judging distance.

With reference to (*a*) the instruction will consist of a demonstration of the mechanism of the rifle and the theory of musketry. (*b*) Each

pupil is allowed 100 rounds with the miniature rifle. A record of each shot will be kept for each pupil in a scoring book, in order to introduce an element of competition among the pupils. Shooting on the range will usually be reserved for the oldest pupils towards the end of the course. Each pupil will be allowed 40 cartridges annually, but some of these will be reserved for match shooting amongst the pupils.

As regards (3) the boys' clubs are apparently intended to deal with the boys in much the same way as the Boy Scout movement in England, and especially to withdraw them from the evil influences of street life.

C. E. P.

Physical Training of Youths in Italy. *Internationale Revue*, 1910, p. 333.—Italy has recently reduced the period of compulsory service with the colours to two years. In order to compensate for this loss of training time it is proposed to make systematic physical training obligatory in all schools, whether public or private.

The suggested physical training will include gymnastics, target practice, singing in chorus and other exercises designed to strengthen the body and develop the character.

In the elementary schools half an hour daily is to be devoted to this training, in the middle schools three hours in each week are to be given up to physical training without increasing the total time in school. Boys are to be grouped in classes not exceeding forty in each; selection for these classes is to be quite independent of their position in school. At least once a month pupils of the higher elementary and middle schools are to be taken out for an instructional march with the object of awakening their interest in history, science and art. No pupil can be promoted into the next higher class, or receive a leaving certificate, who has not qualified in physical training.

In the universities and high schools a course of instruction on physical education has been introduced; this must be attended by all students who wish to obtain a diploma as teacher. The gymnastic schools in Rome, Turin, and Naples are to become schools of instruction for training teachers of both sexes in physical education; these institutions will have the sole right to grant a diploma in this subject. The course of instruction will last two years, and will include anatomy, physiology and hygiene, theoretical and practical gymnastics, fencing, target practice, rowing, swimming, and singing. Teachers of physical training in middle schools must give at least fifteen hours instruction weekly; for every additional hour per week they will receive an additional £3 per annum, but the number of hours of instruction in each week must not exceed thirty.

C. E. P.

Physical Training of Youths in Switzerland. *Internationale Revue*, 1910, p. 341.—The Swiss Federal Council has issued "Regulations for the Gymnastic and Preliminary Military Training of Youths." The following are the salient features of the ordinance:—

Gymnastic training is obligatory for all youths who are obliged by law to attend school.

The instruction will be divided into three stages to suit the age of the different scholars.

In the first stage the instruction consists mainly of games and free exercises. Instruction in the next two stages will be carried out according to the rules laid down in "Gymnastic Training as a Preliminary to Military Service" (Turnschule für den Militärischen Vorunterricht).

As a rule not more than fifty boys should be in any one class, and these are, if possible, to be arranged according to the yearly classes. Instruction will be continued during the whole school year. At least two hours a week are to be devoted to gymnastics. The Cantonal authorities are to provide facilities and the necessary apparatus for this training near each school. The Federal Council has the power to inspect the physical training at any time. Reports are to be furnished by each canton once every three years on the state of the gymnastic training and appliances, the first report is due in 1913. Pupil teachers will receive special instruction in the teaching of physical drill.

The Swiss military department will arrange for the teachers' courses of instruction for which the Swiss Government will defray all costs.

After leaving school the preliminary military training will be voluntary, and will consist of instruction without arms and gymnastics, instruction with arms, courses of instruction in shooting, musketry course for youths. The intention of the authorities is to provide facilities for youths to attend preliminary instruction and so prepare themselves for military service. This training may also be carried out by any of the various gymnastic societies. There must be a minimum of fifty and a maximum of eighty hours of instruction per annum.

The course of gymnastic instruction includes: marching, running, jumping, free gymnastics, weight lifting, the negotiation of natural and artificial obstacles, climbing and games. Practice marches of 12½ to 20 miles are to be carried out. Pupils who have attended regularly receive a certificate which they are to produce when presenting themselves for military service. The instruction will be inspected by persons appointed by the Swiss military department. The Government will defray the expenses connected with this preliminary training.

The preliminary training with arms is intended to develop the physique of the youths from the sixteenth to the twentieth years, and also to train them to shoot. The gymnastic portion of this training is a short repetition of that given above with the addition of exercises with the rifle. This portion of the course will be given by officers and N.C.O.s' of the army. Village communities may form squads of not less than eight pupils. This instruction may also be given in the "Gymnasien" (higher schools), or in technical schools. The instruction with arms will be directed by a cantonal committee in accordance with the rules issued; this Committee is responsible to the military department that the training is properly carried out. Approximately, half the time will be devoted to physical training and the remainder to musketry. The ammunition (blank and ball cartridges) will be provided free of charge by the Government, as also targets and other material required; the Government will also pay the instructors. The instruction may be carried out by a rifle club according to the programme drawn up by

the Government. A military rifle or short rifle will be provided on loan by the Government for any youth who is being trained in musketry. For each trained youth the Government makes a grant to the rifle club of four shillings, out of which it has to pay all expenses for ammunition, &c. The instruction will be supervised by the cantonal committee, to whom notice must be sent of the times when training is to take place.

All persons engaged in this preliminary training are insured against accidents by the military authorities.

C. E. P.

Further Communication on Cholestearin in Blackwater Fever. (Dr. Külz, Kamerun, *Archiv. Schiffs. Tropen. Hygiene*, Heft. 23, 1910).—The writer referring to the paper (*Deutsch. med. Woch.*, No. 4, 1910) in which Grimm enunciated the theory that cholestearin can successfully inhibit the action of poisons which tend to produce hæmolysis, reports a case in which blackwater fever was successfully treated by cholestearin. The patient was a planter who had taken ½ gramme of quinine on the preceding evening; this was followed shortly afterwards by a rigor and the passage of deeply-stained urine. He was given cholestearin in 2-gramme doses. The rigors, which were occurring morning and evening, continued after the first dose, with a rise of temperature; his blood contained many malarial parasites. After a second dose there were no further rigors, and the urine began to clear. He received altogether six doses in thirty-six hours, and the symptoms of blackwater fever completely cleared up. On the sixth day after the onset of the disease, an acclimatisation course of quinine was begun with very small doses which were gradually increased; at the end of four days he could take 0·6 gramme of quinine a day, and the malarial parasites had disappeared from the blood. The cholestearin was administered dissolved in warm olive oil, which was mixed with hot milk. In a note on Külz's article, Grimm reports six cases treated with the same drug; only one of these died, and he was not seen until *in extremis*. One of the six cases was most interesting, as after each dose of cholestearin the urine cleared up, but when the treatment was stopped, at the patient s request, the blackwater fever returned at once; there were in this case altogether four relapses. C. E. P.

Prophylaxis of Venereal Disease. By Colonel L. M. Maus, Med. Corps, U.S.A. (*J.A.M.S.*, December, 1910).—In this paper Colonel Maus discusses the incidence of venereal disease in the U.S. army, with special reference to the question of prophylaxis. The Annual Report of the Surgeon-General, U.S.A., for the year ending June 30th, 1910, shows that the admissions for venereal disease were 197 per 1,000 of strength. He states that, in his opinion, nearly 9 per cent. of the U.S. army would be found unfit for active service on account of venereal disease.

The German plan of prophylaxis was tried in Ohio in 1905, but was found to be too troublesome for soldiers and therefore failed.

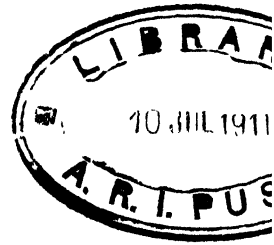
Colonel Maus set to work to devise a satisfactory prophylatic packet. After many experiments he found that calomel 25 per cent. mixed with 75 per cent. lard was an effective preventive of syphilis, gonorrhœa and

soft chancre. Great difficulty was experienced in obtaining a suitable tube to hold the ointment, but this has now been satisfactorily solved.

At a recent camp of instruction, Indiana, some 3,000 tubes were issued. At the end of the camp an inquiry elicited the following information: 504 men had used the tubes, after each exposure to venereal infection; exposure to infection had taken place on a total of 1,301 occasions. Only two men contracted gonorrhœa, and it was doubtful if they had used the tube properly. During the same period, 302 men who had not used the tube had exposed themselves on altogether 763 times. These exposures resulted in one case of syphilis, 26 of gonorrhœa, and 12 chancroids.

C. E. P.

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Original Communications.

SOME POINTS IN THE PREVENTION OF MALARIA AMONG BRITISH TROOPS IN INDIA.

BY CAPTAIN A. B. SMALLMAN.
Royal Army Medical Corps.

FOR many years past the chief object of nearly all sanitary endeavour as regards the British soldier in India has been the reduction of the incidence of enteric fever. The position then taken up by medical officers was, without doubt, the correct one; but it would seem that under present conditions, looking to the great reduction which has been effected in the incidence of this disease during recent years, the time has arrived when the correctness of this attitude may fairly be questioned and it may be asked with some show of reason whether typhoid fever is nowadays the most potent cause of inefficiency.

The question then naturally arises "If typhoid fever is not the most important cause of loss of efficiency, which disease is?" There can be little doubt I think that the answer will be "malaria."

Granted this proposition, what attitude ought now to be adopted? The causes to which the reduction of the incidence of enteric fever are mainly attributable, such as preventive inoculation, removal of possible infectives to convalescent-depôts, the use of the "wet system" in latrines, the use of incineration in the disposal of excreta, the limitation of fly-breeding, &c., &c., may all now be considered to have obtained such a firm foothold among the sanitary measures in regular use in the country, that although many improvements and modifications may, and almost certainly will, arise

in each and all of them, they may now perhaps be left, while taking care that nothing of the nature of retrogression occurs, to the natural processes of evolution.

Following upon this we should naturally turn to malaria and concentrate our efforts more especially on it.

Let us consider for a moment the nature and amount of the inefficiency caused by malaria and compare it with that caused by enteric fever. Its chief characteristic is that the inefficiency due to it is what may well be called a "concealed" inefficiency. The man who contracts enteric fever goes to hospital and may be looked upon as a non-effective for the next six months or so. He thereby drops out of the reckoning for that length of time. A man suffering from malaria is often comparatively fit, and is usually able to carry out his ordinary duties without trouble, and his inefficiency is not revealed until the time comes when a little extra strain, privation, cold or fatigue brings on another attack of fever and renders him useless for the duties of a soldier for the next few days. He is, in fact, exactly the type of man who is useless or worse for the purposes of field service.

In amount the inefficiency is often great and occasionally massive. It has happened before now that a regiment in apparently good physical condition has been marched up to the frontier only to find that with the access of the usual added strain of campaigning, its numbers have been so reduced as to render it unfit for service, and it has been sent back again.

It sometimes happens in a malarious station in India that a so-called "strong as possible" parade is a sight little short of melancholy. The small number of those able to parade owing to the presence of many in hospital, the cachectic and debilitated appearance of those on parade, and the fact of a certain number of those on parade being obliged to fall out, all combine to produce a sad impression.

A recent experience again — that of the number of men on board a home-coming transport who were attacked with a recurrence of an old malarial infection during the voyage—was very enlightening.

During the past two years in India I have had the opportunity of comparing at the autumn manœuvres the power of endurance of two sets of regiments—viz., those from plains stations heavily infected with malaria, and those from comparatively non-malarious stations. The difference, needless to say, was most marked.

It is quite open to question whether any real reduction has taken place in the amount of malaria among British troops in India during the past twenty years, though it is quite true that during this period the figures, as given by the Sanitary Commissioner with the Government of India, show a 50 per cent. decrease in the number of cases admitted to hospital. The reasons for this apparent reduction as noted by the Sanitary Commissioner are probably in the main: (1) The introduction of the treatment as out-patients of many mild cases of disease; and (2) the growing reluctance of many medical officers to diagnose malaria unless the clinical signs and symptoms are confirmed by the finding of the parasite in the blood. That these two causes have been in operation there can, I think, be no doubt.

Assuming, then, that the reduction of malaria in recent years has been very slight or even non-existent, and remembering that in this period has occurred what has been truly called the epoch-making discovery of Ross that malaria is carried by a particular species of mosquito, it is somewhat disheartening to find that, though this discovery is now some thirteen years old, no marked diminution of the malarial incidence among British soldiers in India has yet been effected.

In searching for reasons for this condition of affairs, one suggests itself which is, I think, worthy of more consideration than is usually accorded to it, and which has been put to the proof of practice during the present year, 1910, in the Quetta Division.

On the announcement of his discovery by Ross in 1897 it was widely assumed that the prevention of malaria resolved itself into the means adopted to limit mosquito-breeding, and into the protection of individuals from the bites of mosquitoes. That these means form a very important part of malaria prophylaxis is of course undeniable, but that they constitute the whole is equally open to question. Yet how often is it tacitly assumed that what is meant by "anti-malaria measures" in an Indian cantonment is synonymous with the means taken, however inadequate, to try to limit mosquito-breeding; and how often is another great prophylactic measure at our disposal—viz., the effective use of quinine—lost sight of in, at all events, some of its uses.

Operations designed to limit the amount of mosquito-breeding have been put in force on a large scale in several places now, and some of them have been highly successful—*e.g.*, Ismailia, Klang, Port Swettenham, and the Panama Canal; others perhaps not so

successful—*e.g.*, the West Coast of Africa and Mian Mir. The reasons for success or non-success need not be entered into here, but the point may be noted that the conditions obtaining in the successful ones seem to be very different from those obtaining in the usual Indian Cantonment; and that, therefore, however successful such measures may have been in a place like Ismailia, it does not follow that they will be equally applicable to a cantonment in India.

I am very far from suggesting that we, in India, should abandon to any extent such anti-mosquito measures as we are usually able to adopt; and I am of the opinion that one of the most valuable preventive measures at our command—viz., the efficient use of mosquito nets—will in the future, when knowledge as to the causation of the disease and a true understanding of the real amount of inefficiency caused by it has permeated to all concerned, be widely, if not universally, adopted; but I also consider that in the meantime we, as medical officers of the Army, ought to take into use to perhaps a greater extent than we have generally done hitherto the other prophylactic agent, quinine.

It is considered a logical position to adopt that if mosquito-breeding can be reduced to sufficiently small limits the disease will thereby be stamped out. Surely it is equally logical to assume that if all infected individuals can be disinfected by means of quinine the disease will also be stamped out, and that therefore the two measures should have at least approximately equal values accorded them.

The point I wish to elaborate is, that in the prevention of malaria we have, I think, in the past devoted perhaps too much attention to the mosquito and too little to the man.

Of the value of quinine used in a purely prophylactic sense, *e.g.*, the daily dose of, say, 5 grains, or the larger dose of 10 to 15 grains on two successive days in each week as recommended by the German and Italian schools, it is very difficult to judge, and I am not familiar with any figures which show that one method is better than the other, or the extent to which either is effective. Such figures are very difficult to obtain and are open to many sources of error. I am, however, acquainted with some isolated examples bearing upon this point which will be cited later. This particular use of quinine, however, that of a prophylactic pure and simple, is not the one for which I am contending now. The use of quinine which I wish to bring into special prominence on this occasion is that of the exhibition of the drug to men who have

already contracted the disease, in such doses and for such a period as will suffice to eradicate the parasite from their tissues. This is a use of the drug which we have completely at our command (as contrasted with the limiting of mosquito-breeding by means of drainage schemes), and which I consider we have perhaps in the past to a large extent neglected.

The question at once arises, What amount of the drug must be given and how long must it be continued to achieve this purpose? I do not think it possible to answer the question at present, but as the method was given a thorough trial during the present year, 1910, on the British and some of the Indian troops in the Quetta Division, I should like to record here the details of the method used and the results obtained.

At the beginning of the year all known malaria cases were entered on a roll, case sheets were made out for them, and they began a course of treatment by quinine. All subsequent cases, as they occurred, were treated in the same way. The essence of the system was the Malaria Case Sheet; an example of the particular one used is shown on the next page.

These were carefully kept in accordance with the instructions printed at the head of each, and an abstract was made from them at the end of the year from which the information given below was obtained. The keeping of these sheets involves the expenditure of much time and trouble, and in a large station such as Quetta it is, I think, necessary that one medical officer should be detailed for malaria work only. In Quetta his duties consisted in the treatment of malaria cases in a separate ward in the hospital, the keeping of the case sheets, the carrying on of the after-treatment, and the supervision of the work of the mosquito brigade. This work has been done in Quetta by Lieutenant McGrigor, R.A.M.C., to whom all praise is due for the energy and care he bestowed upon it. Similar duties were carried out in Hyderabad by Captain O'Keeffe, R.A.M.C., and in Karachi by Lieutenant Ryles, R.A.M.C.

The all-important point was to get, as far as possible, every man who was harbouring the malarial parasite under treatment, and keep him under treatment until he was disinfected by the administration of quinine. Consequently the greatest care had to be taken to avoid the occurrence of those cases formerly so common in some places a few years ago, in which a man had a "go" of fever, and was either treated by himself without reporting sick, or by a day's detention in hospital and a few doses of quinine. Hence the instruction at the head of the case sheet: "All cases must be

admitted to hospital." I am well aware that this is an instruction which may be difficult to carry out in some stations in India, but at the same time it might perhaps be done to a larger extent than is sometimes the case.

MALARIA CASE SHEET.

INSTRUCTIONS.

A malaria case sheet will be kept for each man who has an attack of malaria during the year.

A separate roll of these men will be kept for each Regiment and Battery.

All cases should be admitted to Hospital.

After discharge from hospital each case should be treated with Quinine for at least 4 months.

Especial care should be taken in the case of men suffering from malignant tertian infection, to ensure that they do not return to barracks while crescents are to be found in the finger blood.

No man should be struck off the roll until 4 months have elapsed since the last manifestation of the disease, during which time he must have been under continuous Quinine treatment.

NAME No. AGE SERVICE IN INDIA

REGIMENT or BATTERY COMPANY or SQUADRON.

(1) Particulars of first attack in 191 *e.g.* clinical and microscopical features, treatment, &c.

ADMITTED DISCHARGED

(2) Whether fresh infection or recurrence of old infection?

(*a*) If fresh infection give dates showing where probably acquired.

(*b*) If old infection give particulars of previous attacks *e.g.* dates, variety of parasite found, &c.

TREATMENT.

(Any recurrences that may occur during this course of convalescent treatment will be entered in red ink as they occur, giving full details.)

Date	Treatment and Remarks

The difficulty was to know how much quinine must be given, and how long it must be continued in order to disinfect a case. There was nothing to go upon but the bare statement of Ross, that "to extirpate the parasite in a patient demands, let us say, four months assiduous cinchonisation." Four months was therefore adopted as a working basis. The amount of quinine given during the period varied slightly, but the great majority of the

Quetta cases received while in hospital 10 to 15 grains three times a day, and a dose of magnesia sulphate every morning. It may be noted here that out of 275 cases so treated, in only one case was it necessary to reduce the dose owing to unpleasant symptoms. In the benign tertian cases the after-treatment was 10 grains daily for a week, afterwards 10 grains three times a week on roughly alternate days. A saline aperient was given once a week. In the malignant cases the same treatment was used, with the exception that the daily 10-grain dose immediately after leaving hospital was continued for a month. So that during the four months' course the benign cases received about 750 grains, the malignant cases about 950 grains. All quinine was given in solution with one exception, to be noted later. There was some difficulty at first in getting the men to attend regularly, but this disappeared after a time. In a great majority of the cases there was marked, and in some, striking improvement in the general appearance and the "fitness" of the men. In two, however, out of the total this was markedly absent.

In the early part of the year an attempt was made to obtain comparative values by treating different groups of men with different amounts of quinine. It was soon seen, however, that this was not likely to prove of much value with the comparatively small number of cases observed, and it was thought better to get a definite idea of the potentialities of one method in the first place, leaving others to be tried on future occasions as experience might dictate.

Results.—To take the cases belonging to Quetta station first: the total number observed was 275, the vast majority of which were definitely diagnosed microscopically. Out of these twenty-one, or 7·6 per cent., had another malarial attack, either during the treatment or shortly after its completion. These may be divided for convenience of consideration into three classes.

Class 1 contains six men who had a second manifestation of the disease in which the parasite was of a different variety from that found in the original attack. In three of these, the second manifestation took place at intervals varying from three weeks to two months after the cessation of the course, while in the other three it occurred during the course. These last three cases therefore seem to prove the possibility of re-infection occurring during the progress of a course of quinine and are some of the examples referred to above when speaking of quinine as a prophylactic. Another example is that of a medical officer who

had never previously suffered from malaria and who on being posted to a malarious district took a daily dose of 4 grains of quinine continuously for some months in addition to the use of a mosquito net when practicable. After a few months he contracted malaria of the malignant tertian variety.

All six cases in this class can however be excluded when considering relapses.

Class 2 consists of twelve men who had a second attack with the same variety of parasite present in the blood in both attacks, at a varying interval after the completion of the course. These may be looked upon as either recurrences or re-infections. I think it impossible to say which they were, but the intervals between the end of the course and the second attack are suggestive. Thus in seven out of the twelve it was three weeks, in four it was one month, and in one it was fifteen days. This suggests I think re-infection rather than relapse, allowing about a week for the quinine in circulation at the end of the course to be excreted.

Class 3. There remain five instances (not men, for in two men second and third attacks took place) of what, I think, may be fairly called recurrences during treatment, *i.e.*, in which the second attack occurred with the same variety of parasite while the treatment for the first attack was still in progress. One of these was the man above mentioned who was unable to take the quinine in solution and who took tabloids of equal amount.

If, therefore, the exclusion of Classes 1 and 2 be allowed as not recurrences, there remain five recurrences out of 275 cases, giving a percentage of 1·8. If, however, it is considered that those of Class 2 should be looked upon as recurrences, the total becomes seventeen and the percentage 6·1. Perhaps the fairest way would be to take half of Class 2 as recurrences, the other half as re-infections; in which case the total becomes 11 and the percentage 4. In either event I think the result must be considered good.

As regards the comparative tendency of malignant and benign cases to recur, there does not seem to be sufficient evidence to judge; for although sixteen of the twenty-one cases were of the benign variety, and although the five cases definitely put down as recurrences during treatment were all benign, it is to be remembered that the total number of benign cases observed was approximately five times as many as that of the malignant ones.

As regards the curability of a recurrence as compared with a fresh infection, we have some evidence, for up to the present time, with one doubtful exception, no case of fresh infection has relapsed

during or after treatment. This appears to be in accordance with the now well-established fact, that the macrogametes, which are destined to become the latent form of the parasite, do not form until after the second or third attacks of the disease. This has been noted by Nocht (*Deut. Med. Woch.*, March 25th, 1909), and the conclusion is drawn that "the chances that the patient may be protected from recurrent attacks become less the later the treatment is begun." (A scheme of treatment is also given in the same article, but no conclusion seems to have been come to as to the length of time it is necessary to carry it on.) This appears to be a very important point, and is another argument in favour of distinguishing, whenever possible, between a relapse and a fresh infection. For it is probable that a course of quinine shorter than that required for a relapse would be sufficient to cure a fresh infection. The importance of this lies in the difficulty that sometimes occurs in getting the men to attend regularly for a period of four months when at the same time they feel in perfect health.

To consider now the results obtained by similar measures in the Karachi Brigade, *i.e.*, the two stations of Karachi and Hyderabad. It must be noted that the figures have not the same value as the Quetta ones, because of various complicating factors which were introduced. Thus:—

(1) During September and part of October the greater part of the Karachi Brigade was in Quetta for manœuvre purposes, where the conditions are very much less malarious.

(2) In the early part of the year over 100 convalescent malaria cases were removed from the Karachi Brigade to Quetta, where they remained for five months of the hot weather.

(3) Prophylatic issue of quinine is carried out regularly during the hot weather in the Karachi Brigade, but not in Quetta.

(4) The treatment, especially in the early part of the year, varied more.

(5) Owing to distance it was not possible to keep in touch to the same extent, and to profit by experience as time went on.

(6) Owing to changes in medical *personnel* there has not been the same continuity of observation and treatment.

(7) The total number of cases observed was smaller.

The number of men in this group who have finished the four months' course of treatment up to the present time is 180, of whom 22 had second attacks, a percentage of 11·6. Of these 22, 13 were malignant cases, 4 were benign, 2 were double infections, *i.e.*, malignant and benign, while 3 were undifferentiated.

Of the 22, one only had the second attack after the course had been completed, the remainder occurring during the course. In view of the much more malarious conditions obtaining in the Karachi Brigade, and remembering previous years when it was no uncommon experience to see the same man admitted to hospital four, five, or six times for malaria during one season, these results must also, I think, be considered good.

But the fairest comparison is to take the Division as a whole and contrast it with last year, distinguishing while doing so between those factors likely to have an influence in reducing the malaria incidence, which are common to both years, from those peculiar to this year:—

A.—Common to both years.

(1) Anti-mosquito measures.

(2) Prophylactic issue of quinine.

(3) Removal of the greater part of the Karachi Brigade to Quetta in September and October.

B.—Peculiar to this year.

(1) Removal of over 100 potential infectives to Quetta during the malaria season. (The action of this is considered to be, that the total amount of infection liable to be caused by these men would be less in a comparatively non-malarious place such as Quetta).

(2) What may be called "accidental annual variation."

(3) The addition to the strength of the troops in the Division of one infantry regiment, heavily infected with malaria; and the replacement of a lightly-infected mountain battery by one heavily infected.

(4) Systematic treatment of all cases by quinine.

The comparison is shown by the figures in the following table:

Year	Average strength	Cases	Ratio per 1,000
1909	4,467	587	133·6
1910	5,096	457	89·8

—*i.e.*, a roughly 30 per cent. reduction on last year.

Of the factors under heading B, No. 1 operates in the direction of reduction of the incidence to probably a small extent; No. 2 may operate in the direction of either increase or decrease, and cannot be legislated for, though it should always be remembered; the action of No 3 is markedly for increase; while that of No. 4 is undoubtedly all in the direction of decrease of incidence, and I think it is a fair assumption to ascribe the greater part of the very marked lessening of incidence which has been shown to have

occurred, to the adoption of this systematic after-treatment of all cases by quinine.

Considering the subject from this point of view, it will be noted that thereby the question of malaria prevention is brought more into line with other diseases, *e.g.*, typhoid fever, cholera, diphtheria, pneumonia, &c., the spread of which is largely due to the fact of the causal agent of the disease being carried about in the bodies of those who have at some time previously suffered from the disease. It is becoming increasingly apparent as time goes on that in the prevention of such diseases as these, which may be conveniently termed "carrier" diseases, our attention must be directed more and more to the human vehicle of the disease producing organism and less and less to what may be called the external agencies—*e.g.*, water, food, air, &c. On this point a very interesting and instructive paper by Houston, followed by a discussion, may be consulted. (*Brit. Med. Journ.*, No. 2602, November 12, 1910.)

On the assumption that the *rôle* played by the infective individual in this disease is a most important one, it at once becomes obvious that there are many points on which our knowledge is scanty, but which are of great importance from the point of view of prevention. Some of these have to a small extent been inquired into during the year, and may be noted here.

One concerns the time at which a man may be safely discharged from hospital after an attack of malaria. There is, I think, a tendency to discharge men to attend, at too early a date after recovery. The sexual forms of the parasite are well known to persist in the circulating blood for some time after the actual fever has disappeared, but so far as I am aware, there is no definite information as to how long this period is. Text-books give one the idea that in the case of benign tertian the gametes and gametocytes disappear in two or three days; while as to malignant tertian the usual statement is to the effect that the crescents gradually disappear. When one reflects that from the point of view of the spread of the disease, these sexual forms are the only ones that are of any consequence at all, it becomes of paramount importance to know how long they do persist in the circulating blood, for under present conditions, so long as a man has sexual forms in the peripheral blood, so long ought he to be kept, if practicable, in hospital under a mosquito net.

An attempt was made to learn something of the behaviour of the malignant sexual forms in the finger blood—*e.g.*, the time of

persistence, the quantity present, the possibility of intermittency, either diurnal or corresponding to the tertian character of the fever, &c.

To this end a certain measured amount of blood-film, viz., 40 mm., taken daily or twice a day, was examined, and the total number of crescents found in it was counted. Care was taken to choose a part of the film of uniform depth—viz., one cell. The amount examined, viz., 240 fields, took up about as much time as one is usually able to give to the examination of a film in the ordinary routine diagnosis, and was chosen for this reason.

Seven cases altogether were examined in this way, and the end-point was considered to be reached when no crescents could be found in the examinations on three successive days.

The time taken for the crescents to disappear varied from nine to twenty days after their first appearance in the finger blood. There seems to be some correspondence between the total number found and the length of time taken to disappear. Thus the larger the number, the longer will they persist, but even this is not invariable.

The greatest variation, however, is to be found in the actual number present. To take the shortest case, in which none could be found after nine days, though the blood was examined daily for six days afterwards; in those nine days four crescents only were found—*i.e.*, in the examination of 2,160 fields. Compare this with the first nine days of the case which showed most crescents, where no less than 635 crescents were found in the same number of fields. The other cases held intermediate positions between these two extremes.

There does not seem to be any correspondence between the amount of fever or the severity of the attack and the number of crescents subsequently appearing in the blood; indeed, it seemed in some cases that the slighter attacks were accompanied by a larger number of crescents.

At times there were indications of intermittency during the first few days of appearance of the crescents, the increase corresponding to the days on which there would have been fever if the case had gone on. Thus, if the fever appeared on the first, third, and fifth days, the increase would be on the ninth, eleventh, and thirteenth days. This tertian increase was, however, very transitory, and was only noted in two cases.

The crescents do not appear in full force from the beginning.

There is a gradual increase from the time of their first appearance for three or four days up to the maximum, after which there is a steady decline to the disappearing point.

There were also signs in some cases of an evening increase in the numbers, as compared with the morning counts.

The largest number ever found in 40 mm. of blood-film, *i.e.*, 240 fields, was 159.

It was curious to note how often they were found in pairs. Even when they were comparatively scanty in number, two would commonly be found close together

I regret that I made no attempt to separate them into macrogametes and microgametocytes. It would have been interesting to have got an idea of the relative numbers of each.

A rough calculation was made to try and arrive at the number of crescents that would be ingested at a time by a mosquito feeding on one of these cases. I have not been able to find a statement of the thickness of a red blood corpuscle, but it might be taken, I think, for the purposes of this calculation at 1 micron. The diameter of the field of the microscope was $\frac{1}{6}$ mm., the area of the field was therefore (πr^2) approximately $\frac{1}{144} \times 3 = \frac{1}{48}$ sq. mm. The total amount of blood examined was therefore :—

$$\frac{1}{48} \times \frac{1}{1000} \times 40 = \frac{1}{1200} \text{ cub. mm.}$$

Supposing only one crescent was found in this amount, it would correspond to 1,200 in 1 c.mm., or 1,200,000 in 1 cc. Now supposing a mosquito to take up at a feed $\frac{1}{100}$ cc., it would thereby have taken in 12,000 crescents. If only half of these were females, and say only half of these again became fertilised from one cause or another, there would still be left over 3,000 to mature in the stomach wall of the mosquito, each to produce its millions of sporozoites.

In such a case as I am supposing, where only one crescent was found in 240 fields of the microscope, the description would as a rule be "scanty." Such a description could hardly be considered a fair statement of the case in view of the calculation made above.

Two conclusions may, therefore, I think, be drawn, viz.:—

(1) That a malignant case is infective, as a rule, for a fortnight or three weeks from the time that crescents first appear in the finger blood, which time it may be noted is usually about a week after the cessation of the fever.

(2) That a patient may be highly infective when even only one crescent can be found after a good search.

An inquiry such as the above has, I think, a value, however small, of its own, but it would seem that its greatest value lies in the fact that it points out a line of research which might profitably be followed by army medical officers in India.

In this case the malignant variety was used because its sexual forms are so distinctive and easy to identify. A similar inquiry into the behaviour of the sexual forms of the benign tertian variety would be very interesting and probably important.

Again, it is usually stated that quinine has no effect on the appearance or the disappearance of the crescents. Have we sufficient grounds for accepting this statement? If this can be shown to be the case by the aid of proper controls, would it not be worth while trying the effect of some of the newer arsenic compounds such as Soamin or "606" in preventing the appearance of the sexual forms of the parasites in, or causing their disappearance from, the circulating blood?

It will be noted that the point of view taken in what has been written presupposes that the most important centres of infection to the soldier in barracks are his own comrades who have suffered, or are suffering from the disease. This may not be accepted. It may be contended that the surrounding population of infective natives is the more important. It may be so; I think it is very difficult to say, but I do not think it alters the fact that we should try to diminish as far as possible the infective population living within the barracks.

We have to a large extent eliminated the typhoid "carrier" from the barracks; there does not seem any good reason why we should not now try to reduce the potentiality for evil of the malaria "carrier" by appropriate means.

ANTI-MALARIA MEASURES AT COLABA, BOMBAY.

By Lieutenant-Colonel G. F. GUBBIN.
Royal Army Medical Corps.

There has been a "mosquito brigade" at this station for several years, but its success has not been great until the last two years, probably because it was not known that mosquitoes will breed in sea-water, under certain conditions, and in almost any water, however foul, if driven from their favourite haunts by drainage and larvicides.

Description of Colaba.—The Colaba section of Bombay is a peninsula with the entrance to Bombay Harbour on one side and back bay on the other. It is divided into upper, middle, and lower portions, the upper and half the middle portions are in military occupation, the rest is civil. The level of the ground is only a few feet above high-water mark. Colaba resembles other Indian stations in having bungalows with large gardens, requiring much water, which is a piped supply, without, at the present time, any arrangements for the removal of overflow or sullage water from the compound. There are a good many wells, which are imperfectly covered, and which are not now used. There are no large ponds, or jheels. On the north-west side, which is the direction from which the prevailing winds blow, the shore slopes very gradually, and an extensive marsh or mangrove swamp is found, which is only covered during high spring tides. It is here that the anopheles mosquito breeds, more especially during the monsoon when the pits become filled with fresh rain water. On the south-east, or harbour side, the sea is deeper, and the ordinary tides come well up to the coast line, which can therefore easily be dealt with by the mosquito brigade. A portion of the barracks is now connected with the Bombay drainage system; this has necessitated the provision of a large number of traps, which have to be regularly and frequently inspected, more especially those which are not in regular and constant use. The existence of a pipe water supply requires the use of a large number of iron water-tanks, which are in very many cases imperfectly covered, and allow mosquitoes to enter. The proper closure of such tanks is being taken in hand by the military works department as funds allow.

Mosquito Brigade.—A hospital assistant and a sweeper were employed throughout the year to inspect and deal with all mosquito

breeding-places, visiting all such places at least twice a week. During the monsoon, an extra sweeper and also a number of coolies were engaged to drain collections of rain water on the maidans and to construct contour drains on the north-west foreshore, so that the surface water from barracks and water from springs which formed along the foreshore should be collected into defined channels and conducted away to low tide level.

It was considered that if the anti-malaria measures being carried out at Colaba were to be effectual, it would be necessary also to carry out the same measure at the arsenal, and in the island forts, especially Middle Ground and Cross Island, as a large number of the men were constantly exposed to infection at these places.

The Arsenal is in the Fort, Bombay, in the midst of a very malarious district, and about fifteen men were sent there daily on guard duty. Mosquitoes swarmed in this place, and mosquito nets had been supplied out of mosquito brigade funds for several years, but I believe they were little used, and as the guard was changed daily, it was the business of no one to see that these nets were kept in good order. In 1909 attention was therefore directed to this place and all the mosquito breeding places, which were very numerous, were drained or treated with larvicides. The sweeper staff was found to be insufficient, and two extra sweepers were supplied and paid for from brigade funds. As mosquito nets were little used it was suggested that punkahs would be more suitable at night. These were put up, and coolies for pulling them provided out of regimental funds. All these measures have been successful, so much so that the men who used to look forward with detestation to a tour of duty on "arsenal guard" have now no more objection to it than to one on their own quarter guard.

Middle Ground and Cross Island forts have always been noted for the number of cases of malarial infection in the men stationed in them, although mosquito nets were provided several years ago. The *Anopheles stephensi*, the infecting mosquito of Bombay, was present in both forts. Large iron tanks are used for the storage of water; these are covered with wooden covers, which become warped and allow the mosquito to enter, and formerly larvæ could always be found in them. To prevent this, sackcloth covers were made to fit over the tops. There is an extensive system of drains through these forts, which at Middle Ground have very little fall; water consequently lodges and this breeds mosquitoes. The construction of these cannot be improved without much expense; it is therefore arranged to flush them thoroughly once a week with sea water.

There are very numerous places throughout these forts for the collection of water during the monsoon, some of the places being under the guns, and it is almost impossible to reach them. In the dry season an attempt was made to get rid of hibernating mosquitoes by means of sulphur-dioxide gas ; sulphur was burnt in the passages and underground rooms where it was safe to do so. Wherever it was possible collections of water were searched for and treated with kerosene oil. The detachments of the Royal Garrison Artillery stationed in the forts were instructed where to find mosquito larvæ and how to destroy them. N.C.O.'s and men employed in barracks on sanitary duties were also instructed by the mosquito brigade how to keep collections of water from breeding larvæ in the immediate vicinity of the quarters for which they were responsible. To do the required work effectually the mosquito brigade must consist of a permanent staff; it is of little use to employ soldiers who are liable to be changed every few weeks or months. In a small station like Colaba it requires at least a week to show a fresh hand round the station, including the arsenal and harbour forts, and to point out all the breeding places and the means employed to destroy mosquitoes.

Mosquito Prevention.—Cleanliness is inimical to the breeding of the mosquito. For example, should there be a collection of clean sea water in a depression on the rocks along the sea shore, no mosquito larvæ will be found in this so long as it remains clean, but should a person urinate or defæcate into it, mosquito larvæ readily breed, either *Culex* or *A. rossii.* The surface drainage must be cleared and kept open during the monsoon. It appears that it is the duty of the troops occupying the barracks to do this work, and not the Military Works Department; it was carried out effectively at Colaba by the defaulters.

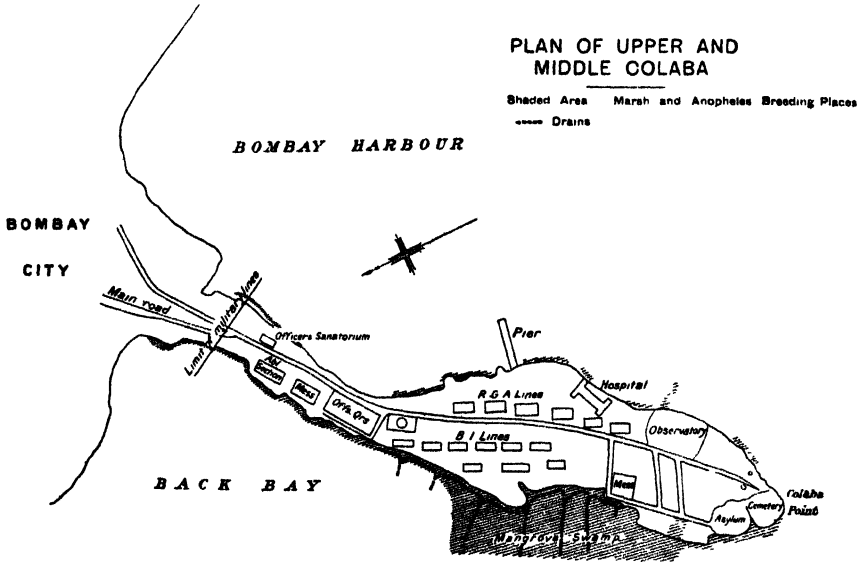
The sea shore must be kept clean, and no dumping of rubbish allowed. Until the monsoon of 1909 it was the custom for the regimental dairy contractor to deposit the cow dung of about seventy head of cattle on the north-west foreshore during the rains when it was impossible to dry it for fuel. This practice was stopped in 1909, and already a great improvement is apparent in the cleanliness of this portion of the seashore. Further, cow dung is food for the larvæ of mosquitoes, which thrive in sea water in which cow dung is placed, whilst they quickly die in pure sea water.

It has also been the custom in the past for the troops to make pits along the north-west foreshore to obtain earth for the repair of rifle butts, and also during military training. The practice of

making borrow pits was stopped, and regimental orders were given that all pits made during military training should be filled up afterwards.

Natives prefer to use the foreshore for purposes of nature rather than the latrines; the police, both military and lascar, were required to watch for this practice and prevent it as much as possible.

Just before the monsoon, a sweeper was employed to go through the station and collect old tins, bottles, &c., and a large quantity of these were removed from various places.



In the rainy season, during neap-tides, the marshy foreshore on the north-west is covered with rain water and with water from the barrack surface drains, in which myriads of anopheles larvæ are bred. Before the monsoon of 1909 the construction of contour drains was begun (see plan) so that all surface water, and water from springs which formed along the sea shore, could be directed into definite channels and conducted to low water level, rather than spread all over the marsh, as had been the case before. This was quite successful and greatly reduced the work of the mosquito brigade by diminishing the number of ponds which had to be treated with kerosene oil.

Steps were taken to prevent the netting of small fish, large numbers of which were present in the pools. These fish ate mosquito larvæ readily when kept in a bottle in the laboratory, but I think it is doubtful whether they do so to the same extent when free in the swamp, where other food is available; did they do so, I think it would have been impossible to have found the myriads of larvæ which were formerly bred in these swamps.

Mosquito Destruction.—As stated before, whenever possible stagnant water and pools were got rid of, or regularly emptied and dried, and the servants of the occupiers of bungalows and other places were instructed how to recognize and get rid of larvæ. Occupiers of barracks and other places were invited to report at once to the station hospital any increase of mosquitoes noted.

Common kerosene oil was chiefly used for treating the pools. This is sprayed over the surface with a syringe, resembling an ordinary garden syringe, with a receiver to contain oil connected with fine tubes, just as in the ordinary toilet spray producer. The apparatus costs 2 rupees 8 cents in Bombay, and greatly economises the expenditure of kerosene.

"Pesterine" is much used in Bombay, but it is slower in its action, and, although cheaper than kerosene, is less suitable, especially in open water where the coating formed by the oil is liable to be quickly destroyed by the wind. A mixture of the two acts more quickly than "Pesterine" alone.

For small collections of water, such as in holes of trees, depressions in rocks, in remains of broken glass bottles on walls, in the leaves of some shrubs, in catch pits of the drainage system, in the stumps of banana trees, in the various parts of gun carriages, and in other places where water can collect, crude carbolic acid was found more suitable than oil—it should be poured in, but not stirred, so that globules are formed which kill the larvæ at once. Carbolic acid is unsuitable for larger collections of water because of the large quantity which would be required, and because it also kills all the small fish and water insects.

In the hope of destroying hibernating female mosquitoes sulphur was burnt in store rooms, empty bungalows, and in certain rooms in the forts, especially during the winter season, and whenever such rooms were reported to contain many mosquitoes.

The evolution of sulphur-dioxide gas in rooms drives out the mosquitoes, but I have not been able to satisfy myself that they are killed by this gas. However, several badly-infested work-rooms in the forts were cleared of mosquitoes by this method.

Results of the Measures.—There has been a great reduction in the numbers of all the species of mosquito at Colaba, in the Arsenal, and in the island forts since the end of the year 1908. Since the beginning of the year 1909, up to the present date, no mosquito nets have been used in the Station Hospital and in many of the bungalows; whilst in others it has been quite impossible to clear out all the Culex mosquitoes.

It is impossible to say at present what has been the effect of the measures on the prevalence of malaria, on account of the changes of regiments and corps. The Gloucestershire Regiment arrived from Mian Mir in February, 1909, badly infected, with the result that the number of admissions to hospital for malaria for the year 1909, up to the end of June, was higher than had been the case for very many years; but from the end of June onwards the admissions were much reduced, which caused the total for the year to work out much the same as is usual at Colaba

The Mosquitoes Found.—Anopheles rossii and *stephensi*, Culex mosquitoes and *Stegomyia*. *A. rossii* is very numerous, especially in the monsoon. It is doubtful whether *A. stephensi* exists at Colaba, as I only succeeded in finding the larvæ once, but this mosquito has been constantly found in the island forts and in the Arsenal, so that the men of the garrison are liable to infection with malaria in all these places (the *A. stephensi* being the principal malaria carrier in Bombay, even if Colaba be kept clear.)

Cost of Measures.—Until the end of the year 1908 a grant of 300 rupees a year was allowed; in 1909, 500 rupees. In 1910 only 400 rupees was asked for as the expenditure was expected to be less, because the contour drainage, which was begun in 1909 only required opening up, for the most part, during the monsoon of 1910. This expenditure included the payment of the staff employed, purchase and repair of mosquito nets in the forts, of larvicides and apparatus, and the hire of coolies during the monsoon. As mosquito nets if supplied to the troops would cause an initial expense of at least 5,000 rupees, it must be agreed that the above expenditure which renders them unnecessary at Colaba is justified.

AN ELEMENTARY INQUIRY AS TO THE ORIGIN OF SPECIES.

By Brevet-Colonel R. H. FIRTH.
Royal Army Medical Corps.

A fortunate location in the hills of India having permitted of the continuance, if not the actual completion, of a series of observations as to some elemental facts concerning the origin of species and certain questions concerning heredity, it may not be without interest to readers of our Journal to summarise the main results of these observations and the considerations which suggested their inception, as well as the conclusions which may be deduced therefrom.

It will be logical to begin with a review of the primary considerations which prompted an inquiry of this nature. To the most superficial observer and thinker it is evident that, at some remote period in the history of our earth, the living matter must have been quite unlike any living forms we are familiar with at the present time. From that period, a definite upward movement has been progressing, involving not only an evolution from the simple to the complex but also a production of many forms from the few. How great is the period of time which these changes cover we need not wait to consider. In fact, we do not know, and probably are quite unable mentally to appreciate the ages concerned in this evolution; it suffices, therefore, to affirm our belief that such a period has been. But the question confronts us: how and by what processes has this evolution from the simple to the complex, and the production of many forms from the few come about? We cannot assume that this evolution has been characterised by a series of successful changes only on the part of protoplasm, in spite of the ever changing conditions to which it has been exposed since its beginning. On the contrary, it is more than probable that the succession of forms assumed by living matter in its development into existing types is the outcome of a most devious pilgrimage, marked at times by progress, at times by halts, and at other times by retrogression.

Many have speculated as to, and endeavoured to explain, the laws which have influenced, if not actually dominated, this pilgrimage from the few to the many. It is unnecessary to review this field of thought and work in any great detail. To many the theory of natural selection, as it has been termed, is sufficient; practically, this amounts to the assumption that, as the whole population com-

prised in a species is in a constant state of variation, the individuals which show features better adapted to the environment survive, while the less fit perish. There are certain objections which render this conception insufficient and unacceptable. Thus, in spite of reliable records of several species which embrace their history for many years, the gradual transformations, which the theory demands and implies, whereby a species deviates from the ancestral type until in the course of time the differences become so great as to be appreciable and specific, have not been observed and are not observable. Moreover, it is doubtful whether the earth is old enough to have permitted the development of the vast number of organisms which now inhabit it by this method of infinitely small changes during each generation. Again, the variations or fluctuations shown by the individuals in any known species do not depart from an ascertainable average, nor exceed definite measurable limits.

Closely associated with this theory of natural selection is the idea that an organism evolves rudimentary structures merely as a result of internal forces, and without reference to environment or utility, and that these rudimentary organs may, in the course of generations, increase in size and structure, and finally become even fully functional. There are grave difficulties in the way of accepting this conception of what has been called orthogenesis. Not the least difficulty is the fact that our modern knowledge concerning the morphology of plants and animals tends to place all morphological processes upon a purely physiological basis, and renders any notion of a pre-functional formation of organs untenable. If we assume, however, that an organ may mutate or vary in any direction from any stage in its development, limited or governed by its morphological possibilities, then the difficulties are less, and the situation clearer. We here arrive at a conception of continuous or determinate variations. Many facts observed in plant mutations support this, notably those which relate to hybridisation, whereby fixed forms self-maintenant and constant have resulted from the fertilisation of the egg-cell of one species by the pollen of another. These fixed hybrids are known by thousands, and it is clear that hybridisation has played, and is playing a large part in the evolution of species among plants certainly, and probably equally so among animals.

We have referred so far to the action of continuous variation and of hybridisation, but there is a third method by which new characters and new species are known to arrive; it is that of dis-

continuous mutation or variation. By the intelligent observer of plants or flowers a few individuals are to be found in each generation which differ markedly from the type both in morphological and functional features. These divergents are to be observed, and have been observed, scores of times in carefully pedigreed strains, in which hybridisation or chance fertilisation has been carefully precluded. A number have been under our own observation covering the last five years. These divergents or sports are variably hereditable, and constitute really breaks in descent by which occasionally new species originate. The literature in regard to this is large, but the major part is represented by the classic work of De Vries, who was the first to appreciate its phylogenetic importance. Most of the work in this direction has been done upon Lamarck's evening primrose, whose mutations are both frequent and easy to trace. This plant, as originally observed by De Vries. was found to give some 3 per cent. of plantlets which diverge widely from the type, and in fact are culturable into new species. One variety, *Œnothera scintillana*, is a notorious mutant. Another, *Œ. gigas*, is even more vigorous than its parent *Œ. lamarckiana*, and is able to beat the parent in all phases of the struggle for existence.

Carefully protected and pedigreed strains of *Epilobium hirsutum* have been under our observation for four years, and some 2 per cent. of the progeny are atypical, surviving and breeding true. These atypical plants have the middle cauline leaves small, rarely more than 1 to 1¼ inch in length, sessile but not semi-amplexicaul, very slightly pubescent, and no white silky hairs on the plant. The nerves on the under surface of the leaves are raised, but impressed on the upper surface. In the parent plant the middle cauline leaves are large, often quite 3 inches in length, sessile, semi-amplexicaul, and softly pubescent on both surfaces. The stigmas are distinct as in the parent, at first erect, but ultimately spreading outwards and club-shaped. The seeds are narrowly elliptic instead of being ellipsoid as in the parent; they are minutely papillose. The flowers of the atypical plant are somewhat unlike those of the parent, being rather a pale than a true purple-pink, but the difference in shade is not a point on which stress is laid. The general features of this mutant are suggestive but not characteristic of *E. lætum*, in which case, then, a fresh example has been found of an aberrant, hitherto not observed, as arising from *E. hirsutum*, and able to survive as a separate species. Recently we have been able to observe the common evening

primrose of the hills round Simla, notably at Kufri, Fagu, and Mahasu, namely *E. roseum*, to give, under rigid protective precautions, atypic individuals conforming to a single type. This observation is of special interest, as we have found the same type growing wild in the district from which the original parental form was obtained. So here we have the survival of a species which is capable of demonstration to be arriving in a small percentage of the progeny of the parental form.

It must not be assumed that these and similar observations on plants of the *Onagraceæ* are exceptional; on the contrary, scores of records of the sudden appearance of sports and forms of the aspect of species are to be found in the literature of both horticulture and botany. Their value lies in that they enable us to grasp general principles as to the organisation of plant life, and to see the meaning of these jumps or breaks on the greater problem of heredity and the origin of species. Every plant, animal, and even man himself, is nothing but a complex group of indivisible unit characters, which unit characters are not always expressible or recognisable in external anatomical features, since they may be inactive or latent. Hence, in attempting to explain or trace the origin of a species, we can speak of the unit characters being retrogressive when latent, or progressive when active. Thus, loss of colour by a mutant is a retrogressive mutation, and the forming of laciniate leaves by a mutant from a plant with simple leaves is a progressive mutation. In this latter case, the simple leaf unit character may be said to be in a latent condition, while in the former case, the unit character of colour formation is equally latent. These latent characters may be carried for many generations, being awakened from time to time by the application of a suitable stimulus, or they may remain entirely inactive. Those who have worked at the hybridisation of plants, such as pansies, will be familiar with many examples of latency capable of easy analysis.

The question which presents itself at this stage is, what stimulus is most dominant in either rousing latent unit characters into activity or throwing active unit characters into latency? Of all the hypotheses which have been advanced, the one which is prominent at the present time and which perhaps is most worthy of serious consideration, is that which predicates that organisms undergo alterations as a direct reaction to nutrition and environment. These alterations involve changes in organs or functions, and the altered characters become fixed, the organism thereby having

received a permanent effect from its habitat. We recognize fully the intricacies and fallacies which centre round this hypothesis, but the possibility that permanent changes may be induced by environment or other external stimuli cannot be denied, and it is essentially a subject of critical inquiry, if we are to advance in our knowledge as to the origin of species.

In attempting to elucidate the causes which affect or favour mutations we are in a position to affirm, from considerable personal observation, the general rule or law that mutants are found only under conditions most favourable to the growth and reproduction of the parent type. That is, mutation is most frequent when the conditions are such as to favour the maximum activity of the parental form. So too, mutations, when they do arise, do not produce new species readily under unfavourable environment. Whatever may be the direct exciting cause, the changes which result in the formation of atypic individuals from seeds must theoretically be in the cells or chromasomes of the germ cells, antecedent to the reducing divisions in the formation of the ovum or in the pollen cells. Cytology has so far been able to throw no light on this stage, but, whatever the nature of the cell changes may be, it is obvious that in a mutation, during the reducing divisions of the cells some character or quality inherent in those cells must be thrown into a latent condition, perhaps lost, while synchronously other qualities may be acquired or roused into activity. It is, further, not too much to assume that this aberrant action of the chromasomes which results in a jump, break, or mutation, must be in response to a stimulus outside of the protoblast in which it actually occurs. This stimulation is probably of the nature of an enzyme produced by masses of cells in the immediate vicinity, and need not be the effect or product of climatic or other environmental factors. The results of certain experiments which we have been carrying on for some time lend considerable support to this view.

During 1906, 1907, and 1908, some exceptionally fine and pure pedigreed strains of *Œnothera lamarckiana*, *Œ. tetraptera*, *Œ. odorata*, *Epilobium parviflorum*, *E. hirsutum*, and *E. cylindricum* were under culture and observation. To test the effects of environment, nutrition, and other possible external disturbing or stimulating agencies, series of these plants were grown in various soils, watered with weak saline solutions, such as common salt, nitrate of potassium, carbonate of lime, carbonate of ammonium, sulphate of soda, and sulphate of iron. Similar series were grown under varying conditions of temperature and moisture, and another series

were grown under special environic conditions of red, yellow, and blue light. In but one series only were aberrant forms observed. This was in the case of *E. parviflorum*, where, watered with nitrate of potassium, seeds were obtained which, in the next generation, gave a plant in which the stem and leaves were marked by very shaggy hairs, the leaves were definitely stalked, not sessile, distinctly stem-clasping, in shape ovate, with large sharp teeth. This aberrant form did not conform to any known variety of type, and differed markedly in its stem and leaves from the parental form. It was successfully passed to the second generation but not beyond. The light series were curiously unaffected by the altered environment, except it be in the case of *E. cylindricum*, which, under a red light, gave plants with well-marked angular stems, in place of the parental cylindric form.

During 1909-10 the same observations were continued, but on a lesser scale. The results have been negative; but another series of experiments were tried in which weak solutions of the above-named salts were injected by means of a fine needle into the ovaries. The strength of the solution was in all cases 1 in 1,000, and the quantity injected from a tenth to a fifth of a cubic centimetre. The results in the majority of cases were an evident killing of the unfertilised ovules, but in a few cases the effect has been striking. Thus, *E. roseum*, when injected with common salt and carbonate of ammonium, resulted in a number of aberrant forms of a quite unknown type. This is specially interesting, as *E. roseum* is not generally recognised as a mutant, though as stated in a previous part of this paper, we have reason to believe that it is. The aberrant forms, following injection into the ovaries, in no case agreed with the aberrant form already mentioned as occurring under strict cultivation. Three of these new forms were brought to bloom and maturity, and in one case to a second generation. This imitation is strongly suggestive of being a potential new species. It differs from the parental form mainly in having a slender stem, faintly pubescent, with the middle cauline leaves unusually small, the majority being from $\frac{1}{4}$ to $\frac{3}{4}$ inch in length, obscurely denticulate and narrow elliptic in shape. The flowers were few, and only at the end of the branches. The effect of ovarian injections upon *Œ. lamarckiana* was not noticeable as producing many atypic forms. A few were observed, but as this plant is a notorious mutant no special importance is placed on the few aberrants obtained. In the case of *Œ. odorata*, after injections of carbonate of ammonia, a curious bloom was obtained

which reminded one strongly of *Œ. gigas*. This bloom remained sterile. The effects on *E. hirsutum* were not apparent, except in one series after injections of nitrate of potassium. In this case an aberrant form resulted, which presented many features of another genus, namely the *Circeæ*. The most noticeable feature of the flower was its smallness, being not more than $\frac{1}{3}$ inch, with two notched petals, two stamens, a capitate stigma, a filiform style, and only two-celled ovary. The seeds were naked, and on maturation yielded a plant practically reverting to the parental type of the *Onagraceæ*.

It is must be admitted these results are small, in fact too crude to be quite satisfactory. So far as our information goes, we believe them to be on original lines. The results are so encouraging that we think them to mark an altogether new step forward in the experimental study of the origin of species.

It may be advanced by some critics that the results mean little, in that we have no proof that such intrusion of stimulating substances into the ovarian tissues can or does occur in Nature. It is true we have no proof of this occurring in Nature, but it is not too much to assume the penetration of the ovary of a flower or plant by the mycelia of fungi or by an insect's sting. It is conceivable even that foreign pollen tubes which contain the generative nuclei of the foreign pollen parent may be affected by extraneous stimulating or disturbing substances, either in the course of transference, or even in the pistil which they invade. There unusual adjuvants can conceivably cause the transmission of parental characters to be changed, and thus unit characters may appear in the progeny which are not active in either parent. The weak point in the results of these few experimental observations lies in the fact that whatever changes were brought about, by the ovarian injections, are *sequelæ* to disturbances to the germ plasm after the reducing divisions of the chromatomes. In some preceding remarks we have laid stress upon the idea that, in the case of natural mutations, the changes associated with a break or jump in inherited characters must occur before the reduction divisions. This question of the time when the disturbing factor acts, or is able to act, probably makes all the difference As yet, we have been unable to devise an experiment in which a stimulus can be applied to the germ plasm, even in a plant, antecedent to the reducing divisions of the chromatomes. The perusal of this note may possibly stimulate others to overcome the difficulty. Of one thing we are convinced, that is, it offers a wide and interesting field of work.

At the risk of making this note longer than is perhaps advisable,

one is tempted to call attention to the curious fact that, in the grosser morphological features by which mutants differ or depart from the parental form, the range of variability of these features round their average is much greater than the range of variability of the corresponding character in the parent. In the comparatively small series we have been able to observe this has been very obvious. Thus, in the case of *E. parviflorum*, a series of 311 leaves from the aberrant form gave a range of variation of the ratio of width to length with a variability co-efficient of 10·61 ± 0·23 per cent., whereas a series of 334 homologous leaves from the parent gave a co-efficient of variability of 9·8 ± 0·22 per cent. Similar results were noted in the case of *E. roseum* and its atypic forms, as well as in *E. hirsutum*. In both these latter cases, correlation tables were worked out and the series of leaves were large, being 743 and 640 respectively in the one case and 709 and 626 in the other. The co-efficient of correlation as to width and length of leaves in the parent *E. roseum* was 0·8133 ± 0·0088, while in the aberrant the co-efficient was 0·6530 ± 0·0122. The *E. hirsutum*, the corresponding figures were 0·7813 ± 0·0089 and 0·6395 ± 0·0114.

It may be asked, why go to the trouble of making these measurements of leaves or other parts of a plant, be it typical or atypical? The answer is, this mathematical analysis of data affords an interesting check on other methods and suggests means to distinguish between a recently evolved feature and one which has been characteristic of a related species for ages. It may not be as exact as it is laborious, still it is another means to the acquirement of knowledge and worthy of attention.

The deduction we draw from these few observations is, that new species may and do arrive not only by hybridisation but by mutations. In the majority of cases probably by the former. The mutation conception is still undeveloped and still imperfectly understood, but it co-ordinates a mass of hitherto unintelligible facts. Admitting the existence of mutants, which we must, we recognise that the greater number perish, because they do not meet all the conditions necessary for their survival. In other words, it is a case of natural selection among species, by which a few aberrants are selected for survival; those not selected perish quite regardless of how often or for how long they may be produced by the parental form. The day is probably not far distant when the nature of the induced changes which produce a mutation will be understood; and, when that day arrives, man will be able to apply inducive agents in a manner to guide development, and thus help if not supplant Nature in the evolution of organisms.

PARATYPHOID FEVERS IN SOUTH AFRICA.[1]

By Major J. G. McNAUGHT.
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When I was asked to prepare a paper for the South African Medical Congress, I found it somewhat difficult to choose a subject. There are many medical problems awaiting solution in this country, but with most of them we in the Army have little opportunity of making more than a superficial acquaintance. Of recent years, thanks to improved sanitary conditions, dysentery and liver abscess have become rare, bilharzia occurs only as isolated cases, and even typhoid fever, though still too common, has fallen to a comparatively low level. The following statistics will show how great has been the improvement :—

Per 1,000 per annum		1902-05	1906	1907	1908
Enteric fever.	Cases	26·4	9·3	10·0	9·2
	Deaths	3·02	1·0	0·65	0·78
Dysentery.	Cases	15·2	4·6	4·0	1·7
	Deaths	0·37	*Nil*	0·06	0·14

The continued fevers still remain the subject of greatest interest to us, and of late the question of paratyphoid fever, its prevalence, its forms, and its relationship to, and differentiation from, true typhoid fever, has attracted a great deal of attention. The subject is one which still requires a great deal of elucidation, and it is more with the view of throwing out suggestions for future lines of investigation than with the hope of contributing very much to its solution that I have written this paper.

It was only in 1896 that bacilli of the "paratyphoid" group were first described. In the first instances they were discovered in urine and in pus; in 1898 they were isolated from the blood of patients. Since that date a great deal of work on the subject has been carried out, chiefly in France and Germany. Before giving a *résumé* of the present state of our knowledge of paratyphoid fever, I will shortly state the characters of the bacilli concerned. Their cultural characters place them in the coli-typhoid group, intermediate between *Bacillus coli* on the one hand and *B. typhosus* on the other.

B. paratyphosus B, the commoner variety, differs from *B. typhosus* in forming acid and gas in glucose media, while it differs from

[1] Read at the South African Medical Congress.

B. coli in not forming acid and gas in lactose media; *B. paratyphosus* A differs from *B. paratyphosus* B in forming permanent acidity in litmus milk; while *B. paratyphosus* B, after a preliminary formation of acid, renders the milk finally alkaline.

	Indol	Litmus milk	Neutral red broth	Glucose	Lactose	Mannite
B. coli	+ (exceptionally −)	Acid and clot ..	Fluorescence	+	+	+
B. paratyphosus B ..	None or slight..	Acid first, then alkali; no clot	..	+	−	+
B. paratyphosus A ..	None or slight..	Acid; no clot ..	..	+	−	+
B. typhosus	None (rarely, slight)	Slight acid (usually permanent)	No change ..	A	−	A
B. fæcalis alcaligenes	None (rarely, slight) ..	Rapid and intense alkali formation	Yellow colour; no fluorescence	−	−	−

As regards motility, *B. coli* is usually slightly motile, *B. typhosus* more actively motile, while *B. paratyphosus* B is extremely motile.

The Gaertner group of bacilli, *i.e.*, *B. enteritidis*, *B. danysz*, *B. suipestifer*—are morphologically and culturally identical with *B. paratyphosus* B, and the pathological effects on small laboratory animals are the same; *B. paratyphosus* B, however, can be differentiated from them by immunity and agglutination tests.

Paratyphoid fever appears to be much less common in England than in France or Germany. Boycott, in 1906, investigated a large number of cases of typhoid fever, and came to the conclusion that 3 per cent. were "paratyphoid." Savage (Local Government Board Reports, 1908-1909) has more recently carried out very extensive investigations with a view to settle this question, and has come to the same conclusion—viz., that 3 per cent. of cases regarded as typhoid fever are really due to paratyphoid bacilli. I may add that *B. paratyphosus* A seems to be of extremely rare occurrence, nearly all the cases of paratyphoid fever reported, in Europe at all events, are due to *B. paratyphosus* B.

In India, paratyphoid fever is a rare disease among the troops. The Army Medical Department Report for 1907 states that out of a very large number of cases of typhoid fever investigated at the Central Research Institute, Kasauli, by means of cultures from blood, urine, and fæces, only six cases were found to be paratyphoid; in four cases *B. paratyphosus* A was the organism present, and in two cases *B. paratyphosus* B. In 1908 paratyphoid bacilli were only isolated from four cases, the organism present

in three cases being *B. paratyphosus* A. It would appear that in India, so far as we can judge from the small number of positive results, *B. paratyphosus* A is more frequently the cause of paratyphoid fever than *B. paratyphosus* B.

In 1897-98 I was stationed at Quetta during a very severe epidemic of enteric fever, and, in collaboration with Lieutenant-Colonel Melville, R.A.M.C., applied the agglutination test to a large number of cases: with hardly any exceptions these cases gave well-marked positive reactions with *B. typhosus.* One case which gave a weak reaction with *B. typhosus,* and whose clinical course was characterised by irregular continued fever and frequent hæmorrhages from the bowel, died. The *post-mortem* examination showed multiple abscesses of the liver, with ulceration (not dysenteric, nor yet typically enteric) of the large and small intestine. From the spleen I isolated a bacillus intermediate in type between *B. coli* and *B. typhosus* (*Lancet,* February 24th, 1900).

In South Africa the relative proportion of cases is quite different. Clinically, one would expect it to be so, as the number of fevers of indefinite type which it is difficult to diagnose enteric fever on clinical grounds alone is, in my experience, relatively higher than in India. Major Statham, R.A.M.C., at Pretoria, has devoted a great deal of attention to the diagnosis of continued fever by means of cultures from the blood. Full particulars of these investigations will be found in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS for September, 1907, and December, 1908. He has come to the conclusion that 25 per cent. of the continued fevers that come under observation among the troops at Pretoria are paratyphoid fever.

Of the cases of typhoid fever among the garrison of the Cape Colony during 1907-1908, forty-eight in all, ten cases should be regarded as paratyphoid fever according to the results of agglutination tests.

Symptomatology of Paratyphoid Fever.—It may at the outset be stated that it is impossible to differentiate paratyphoid fever from typhoid fever by clinical symptoms. It is true that epidemics of paratyphoid fever may present certain features which broadly differentiate them from epidemics of typhoid fever, but there are no striking characters which enable us to distinguish an individual case from typhoid fever. The following characters have been drawn attention to as specially associated with paratyphoid fever:—

(1) Sudden onset. This also occurs not uncommonly in typhoid fever, especially in hot climates.

(2) A specially profuse eruption. This is also noticed in some cases of typhoid fever.

(3) Frequency of hæmorrhage from the bowel, without the severe symptoms which usually accompany this occurrence in true typhoid fever.

(4) Mild course of the disease. The duration of fever is usually shorter than in typhoid fever, and the death-rate is low, only some 2 to 3 per cent.

Savage records the nature of the eruption in six cases : in four of these ordinary rose spots were present, in one case there was also a "rash on the legs," and in one case the spots were larger than those noted in typhoid fever.

Baerman and Echersdorff (*Centralblatt für Bakteriologie* Referate, Bd. xlvi., No. 8, April 18th, 1910), describe a series of eight cases in Sumatra due to *B. paratyphosus* A. All the cases were fairly severe, the fever lasting from two weeks to two months. No rose spots were observed. In 50 per cent. of the cases the spleen was enlarged. There were two fatal cases. *Post-mortem* examination showed diffuse catarrhal inflammation of the intestines.

Bacteriological Methods of Diagnosis.—From what has been said it will be seen that the diagnosis of paratyphoid fever depends on the use of bacteriological methods. Even with such aids it is not always easy to differentiate these cases. The methods available are: (*a*) agglutination tests; (*b*) cultures from the blood; (*c*) cultures from fæces and urine.

As regards agglutination tests, we are met by the difficulty that in some cases a group reaction is present—that is to say, the serum of a patient may agglutinate both *B. typhosus* and *B. paratyphosus* B or *B. paratyphosus* A. Some observers go so far as to say that it is impossible to diagnose paratyphoid fever by serum reactions alone. Cases have been recorded where the serum gave a reaction with one organism, and yet another organism was isolated from the blood or excreta. Most authorities (including Savage) consider that if the agglutination tests are carried out to the limit of highest dilutions obtainable, they can be relied on for diagnosis, the organism which yields the reaction in the highest dilution being considered the causal one. We may then have three categories of cases : (1) Where the serum reacts with one organism only, and not with the others; (2) where the serum reacts with more than one micro-organism, but more strongly with one than with any other; (3) where it reacts with more than one micro-organism, and either equally strongly or with such slight differences

as to be insufficient for diagnosis. Savage remarks that *B. paratyphosus* B, when it gives a positive reaction with a serum, does so in a very sharp fashion, a point which I have also noticed ; indefinite reactions are rare.

Positive results from blood culture methods are of more value than agglutination results. It has been abundantly proved that in typhoid fever, if cultures are made from the blood in an early stage of the disease positive results will be obtained in 90 per cent. of the cases. In the mild indefinite cases which we suspect to be paratyphoid fever, however, we cannot hope to get such a high proportion of successes.

Methods of obtaining Blood.—(*a*) Finger; (*b*) vein; (*c*) plating of clot from samples sent for agglutination tests.

Methods of Culture.—(*a*) Ox-bile ; (*b*) ox-bile + peptone + glycerine ; (*c*) taurocholate of soda + peptone broth ; (*d*) sterilised water. From the fluid media after twenty-four hours' incubation at 37° C. plate cultures are made on such media as Endo's agar, nutrose lactose litmus agar, Fawcus's modification of Conradi's brilliant green picric acid agar, &c.

Cultures may also be made from the urine and stools.

Epidemiological Considerations.—Some outbreaks of paratyphoid fever have been traced to pollution of water supplies. *B. paratyphosus* B has been found in water ; several instances have occurred in this country. Savage believes that infection is usually due to contamination of food, but that no connection can be found between disease in animals and paratyphoid fever in man ; swine fever is due to, or associated with, a closely allied bacillus, but epidemics of swine fever have not been observed to coincide with the occurrence of paratyphoid fever in human beings. Prigge and Sachs-Müke (*Centralblatt für Bacteriologie* Referate, Band xlvi., No. 8, April 18th, 1910) publish accounts of two epidemics of paratyphoid fever due to food. In one epidemic roast pork was the source of infection ; in the other, "creme schnittchen" baked by a baker who was suffering from paratyphoid fever, and passing paratyphoid bacilli in his urine.

Contact infection is common, and is contributed to by the fact that only the severest attacks come under medical treatment. Several cases often occur in the same family.

The campaign against typhoid fever now being carried on in the Rhine provinces of Germany has shown that "carriers" are found in the case of paratyphoid fever as well as in that of true typhoid fever. While female carriers are much commoner than male in the

case of typhoid fever, the reverse appears to hold good for paratyphoid fever. Some investigators have maintained that paratyphoid bacilli are not uncommonly present in the stools of healthy people, and may even be found in their blood as an exceptional occurrence. This view is not generally accepted; Savage's recent investigations for the Local Government Board do not lend it any support.

Prigge and Sachs-Müke (*Klinische Jahrbuch*, Bd. xxii, 1909, H. 2) found that 108 persons out of 5,252 examined were excreting paratyphoid bacilli; 38 of the 108 persons were actually ill. They divide the positive cases into two groups:—

(1) Cases which had been in contact with cases of paratyphoid fever, or who had had the disease and had become carriers.

(2) Cases where no connection with paratyphoid fever could be traced.

The two groups of cases can be differentiated from each other by the following characters:—

(*a*) The first group of cases always gives a positive agglutination reaction in at least 1 to 20 dilution, the second does not.

(*b*) The stools of cases belonging to the first group as a rule yield great numbers of colonies of paratyphoid bacilli.

The differentiation of paratyphoid fever from typhoid fever is not a matter of mere bacteriological interest, but has also a practical bearing—*e.g.*, as regards treatment, and as regards the estimation of the value of vaccination against typhoid fever. Besides the commonly recognized forms of paratyphoid fever there are also continued fevers of somewhat similar type which appear to be associated with other bacilli of the coli-typhoid group. These anomalous fevers are in my experience specially common in South Africa, and present such a distinctive clinical type that one is disappointed in not being able, so far as our present knowledge goes, to refer them to one specific organism. In the past three years I have seen three groups of such cases, which I shall briefly describe.

The first group came under notice at Wynberg, and in two cases which were bacteriologically examined, *B. fæcalis alcaligenes* was isolated from the patients' blood during the course of the fever. The bacillus was agglutinated by the patients' serum. Clinically these cases were very distinctive. The onset was very sudden, with intense headache and photophobia. A characteristic rash appeared on the fifth or sixth day of illness. This rash consisted of dark red spots and blotches, and came out profusely all over the trunk and limbs, including the palms of the hands and soles of the feet. The rash left brownish stains which in one

case took several weeks to disappear. The course of the temperature curve was similar to that of enteric fever. Both cases had fever for between two and three weeks, and in both there was a short relapse associated with symptoms of cholecystitis. The serum of these cases failed to give any reaction with *B. typhosus*, but reacted slightly with *B. paratyphosus* B.

One of the cases was that of an orderly who had been nursing a case of enteric fever which presented certain points of interest. During the course of enteric fever the patient had lung complications, with blood-stained expectoration. On staining the sputum great numbers of a Gram-negative bacillus were found in it, and on making cultures *B. coli* was isolated. During convalescence the patient's urine was twice examined for the presence of *B. typhosus :* it was not found, but on both occasions *B. fæcalis alcaligenes* was isolated. Cases of continued fever associated with *B. fæcalis alcaligenes* have been reported by several French and German investigators.

The second group of cases occurred at Pretoria in 1909 ; there were ten cases in all, most of them coming from one company of a particular regiment. The clinical signs were similar to those noted in the former cases, the same eruption being present, but the course of the fever was shorter, lasting only for one to two weeks. In several cases in which blood cultures were made, the results were negative, and the sera of the patients did not agglutinate *B. typhosus* or *B. paratyphosus* B. From the fæces of one case a bacillus closely resembling *B. typhosus* was isolated. This bacillus differed from the stock laboratory *B. typhosus* in forming acid less rapidly in glucose broth, and in forming in litmus milk slight acidity succeeded by alkalinity. The serum of the patient from whose stools it was isolated agglutinated the bacillus, as did also the sera of the other associated cases. Unfortunately after a few subcultures this bacillus became very readily agglutinable by any serum, although when first isolated it did not agglutinate with control sera.

The third group of cases, some twenty in number, occurred at Roberts' Heights in the early part of 1910. Clinically they were similar to those already described, the same characteristic eruption being present. In this instance the cases were widely distributed over the garrison, including men and women, officers and their families. From two cases Major Statham isolated from the blood a variety of *B. coli*, varying only from a typical *B. coli* in that the clotting of milk only took place very slowly. The sera of all of the

cases in the group agglutinated this bacillus, which was unaffected by the sera of control cases. The agglutinating power of the sera rapidly diminished and disappeared in convalescence.

At the time these cases appeared *B. coli* was found present in 1 cc. of the water supply, and culturally was identical with the *B. coli* isolated from the patients, but the sera of the patients had no agglutinating power on the bacillus isolated from the water supply.

Lieutenant-Colonel Maher, R.A.M.C., informs me that at Potchefstroom a precisely similar fever with characteristic eruption is common. Agglutination tests with *B. typhosus* and *B. paratyphosus* B yield negative results. He says similar cases occur in the town of Potchefstroom, where they are usually diagnosed as "Influenza." In several cases he ascertained that patients had been bitten by ticks two or three days before the onset of the symptoms, and he suggests that the tick may have conveyed the infection. I may say I have stained blood-films from several cases of this fever, but have never found any blood parasites present.

I have seen some thirty cases of this type of fever, and have no doubt that it is a distinct entity, and can be differentiated clinically from enteric fever or the recognised forms of paratyphoid fever. Its leading characters may be shortly summarised as follows :—

(1) The onset is sudden, and is accompanied by particularly severe headache, pains in the back and limbs, dark flush on cheeks, injected conjunctivæ, and suffused eyes. Sometimes the patient has been out of sorts for a few days before the onset of distinct symptoms, but usually the disease sets in quite suddenly.

(2) A characteristic dark red maculo-papular rash, not unlike the rash of German measles, appears all over the trunk and limbs. I have found this rash present on the soles and palms in all cases in which I had an opportunity of looking for it. Interspersed with the characteristic rash are sometimes found lighter red spots like rose spots. The rash leaves brown stains when it fades. It appears earlier than the rash of typhoid fever, sometimes coming out on the second or third day of illness.

(3) The tongue is coated, but not usually dry or brown. Constipation is usual, the motions have a dark brown colour. The spleen is generally enlarged. There may be some abdominal fulness but not marked distension.

(4) The fever lasts from ten to fourteen days as a rule. It usually comes down by rapid lysis, but may do so by crisis. Convalescence is rapid and there are no relapses.

(5) Though the patient often appears to be extremely ill during the first week of the disease, yet I do not know of it ever proving fatal.

As regards diagnosis, these cases have been regarded as influenza, but beyond the severe headache and pains in the limbs, there are no grounds for this diagnosis. They are not contagious like influenza, nor are they accompanied by the respiratory complications or nervous and other sequelæ of that disease. The rash is striking and distinctive.

The sudden onset and rash recall dengue fever, which I have seen in Bombay, but dengue fever is intensely contagious, has distinct joint complications, and has a distinctive course, showing two separate fever periods, each with its characteristic rash.

The recently described "Pappataci" fever is a short fever, lasting only two or three days, is not accompanied with a rash, and, as I know from personal experience, is characterised by very severe pain along the course of nerve trunks.

The South African fever resembles typhus in its onset and duration. The rash is somewhat similar but macular. It is not contagious like typhus, is not dangerous to life, and we do not meet with the mental symptoms we find in typhus: though in the first few days the patient may be dull, this soon passes off.

Since writing the first part of this paper I have read an article by Dr. Nathan E. Brill in the *American Journal of Medical Sciences* for April, 1910, describing "an acute infectious disease of unknown origin," which appears to be identical with the fever I have just brought to notice. Dr. Brill's paper is based on the study of 221 cases observed in the Mount Sinai Hospital, New York, during the past fourteen years. The incubation period is short, usually four or five days. The attack begins with intense headache, apathy and prostration, aching all over the body, chills, and sometimes vomiting. The eyes are dull and suffused, and the conjunctivæ congested. About the sixth day an erythematous, maculo-papular eruption makes its appearance on the back and abdomen, spreading to the limbs, and sometimes involving the palms and soles. The spleen is frequently enlarged; the tongue is coated with white fur, and the bowels are constipated. The fever lasts a fortnight or less, and comes down by lysis or crisis. The disease appears in the summer season, and is not contagious.

The serum of the patient does not agglutinate with *B. typhosus* or with *B. paratyphosus* B, and frequently repeated attempts to isolate bacilli from the blood have proved fruitless. Dr. Brill at

first regarded these cases as belonging to the paratyphoid group, but now considers they form a distinct class by themselves, their clinical features distinctly differentiating them, and the failure to isolate bacilli from the blood militating against their inclusion in the coli-typhoid group.

Dr. Brill's paper merits careful study, as I am certain the disease he so minutely describes is common in South Africa. Although in certain cases organisms of the coli-typhoid group have been isolated from the blood, I am not at all sure that we can therefore set down this fever as a form of paratyphoid. Its clinical course is so distinctive that one would expect to find it associated with one distinctive organism, and not now with one member of the group and now with another. We must remember that in the case of swine fever and fowl cholera, the presence of certain organisms in the blood appears to be rather a concomitant than the cause of the disease, though the question as to whether the bacillus found in the blood, or an invisible virus, is the exciting cause is not yet definitely settled.

INCINERATION IN INDIA.

By Captain P. S. LELEAN.
Royal Army Medical Corps.

Of the many problems of Indian sanitation there can be few which are receiving more attention at present than incineration. Although the matter might better be left to abler advocacy, I am complying with a request to embody the results of some years of practical experimentation in an article which will place these results at the disposal of those of my brother officers who, from choice or necessity, are interested in the work which is being done in India with a view to rendering this method of conservancy a practical success.

The consideration of this problem naturally embraces the following headings :—

(1) Its evolution.
(2) Its present position.
(3) Its progress towards solution.

(1) Evolution of the Problem.

The statement that the backwardness of Indian as compared with European sanitation is due to lack of funds is often made with reference solely to the executive aspects and takes no cognisance of the fact that the slow evolution of sound methods is, in no less degree, the product of economic influences. Economic rather than humanitarian considerations must govern the extent of legitimate expenditure on purely sanitary measures, and the sanitarian must recognise that his proposals must be submitted to the cold logic of the statistician and the economist.

Every day's sickness of the British worker involves immediate loss to the State—hence it has proved to the interests of the State to retain the services of a few whose life-work has been devoted to a study of means to combat conditions inimical to the health of the many. The accumulated experience of years of this highly specialized work has produced the advanced state of British sanitation.

On the other hand, the soldier in India lives only to fight; loss to the State from his sickness during peace would only result if he were incapacitated when wanted to go on service. Hence the economy of providing specialists and funds for studying the causes of his sickness has not been so obvious from the military as from

the civil standpoint. As the problem has presented itself, it has been safer to add to the peace strength a proportion allowing for sickness than to incur expenditure in the hope that reduction of sickness would enable a smaller peace strength to place the same fighting force in the field. It was undoubtedly a wise conservatism to await presumptive evidence that sickness would be reduced by that expenditure; but the lack of special workers and funds delayed that demonstration for many invaluable years. It would probably have been delayed far longer but for the realisation of the fact that sickness is a more powerful factor than the enemy in determining whether the fighting force placed in the field can be effectively maintained there. The era of the special worker has dawned, and it is to be hoped that, in the interests of the Service, experimental funds will be placed at his command.

Other influences than that of lack of funds have borne a large part in delaying the experimental work needed. Formerly devastating epidemics dwarfed the results of sanitary improvements and focussed attention upon the water-borne theory of specific intestinal disease. The death-rate from cholera in 1896 amounted to over three times the death-rate from all causes in the last available return. Attention to the water supplies reduced the incidence of cholera by over 90 per cent. in twenty years, and so great a success led to persistence in attempts to perfect that one means of protection at the expense of all others. It was only the increase of enteric to 200 per cent. in the same period that made it generally recognised that other, and possibly determining, causes had to be sought than those dealt with by the water-borne theory. The army in India is deeply indebted to those pioneers of recent progress who, long since, drew attention to the dangers inherent in Indian conservancy methods of dealing with specifically infected human dejecta.

The trenching system, if effectively carried out, was well adapted for protection of water supplies from specific contamination; it, however, afforded serious scope for the spread of infection by other agencies—notably by diptera—before, and often after, disposal of the *materies morbi* under ground. The importance of this aspect of the question was only just being generally realised when it was unfortunately obscured by the discovery of the "enteric carrier"—the word "unfortunately" being used advisedly with due regard for the probable relative frequency of carrier-borne and fly-borne infections in cases of specific intestinal disease. The obvious importance of discovering the carrier, when existent, is by no means minimised

by an appreciation of the comparative rarity of carriers, and hence of carrier-borne infections; the fly, on the other hand, is ubiquitous and its means of access to possibly infective human dejecta were little interfered with until comparatively recently. If extended observations made elsewhere be applicable to Indian conditions, it would appear that if all soldier post-enterics had been employed as cooks for five years after convalescence, the average of the past ten years would have given a carrier proportion among all cooks employed of only 3 per cent. at any given time. The normal proportion of carriers among cooks in the absence of all attempts to exclude post-enterics would, on the average of the last ten years, amount to about 1 per cent.

It is satisfactory to note, therefore, that the tendency to regard, formerly, infection of water-supplies and, latterly, the enteric carrier as the sole or dominant factor in the conveyance of specific intestinal infections has given place to a broader view, and there has thus again come to the fore the necessity of evolving some method of disposal of human excreta which does not involve that exposure which is so dangerous a feature of the trenching system.

The accumulated experience of European sanitation being inapplicable to Indian conditions, the army sanitarian has had to commence this study almost *de novo*. Methods of biological treatment were tried, under Lieutenant-Colonel Aldridge's direction, and proved to be not only practicable, but to present economic advantages over that of trenching. They were, however, hampered by lack of water; by lack of sufficient drainage gradient in most stations in the plains; and by the disproportionately large ground area covered per unit of population. The need for highly specialized supervision has also militated strongly against general adoption of this valuable method.

The intermittent attention which has been paid to the only other alternative—incineration—has consequently been concentrated. Before the many details regarding its general applicability to Indian conservancy requirements can be finally solved, there is a vast amount of careful observation to be made, and the last word will not be spoken probably for many years to come. Meanwhile funds are urgently needed for that experimental work, by which alone can be obtained those precise data which will enable an accurate estimate to be made of the adaptability and advantages of this method, both in times of peace and war. Considerable advances have been made already, and it is clearly indicated that those who have had the opportunity for systematic trials should

place their results on record, where they will serve for the guidance of subsequent workers, who will thus be spared much vain repetition of pioneer work already done.

The Problem in its Present Stage.

The questions which the Combatant Authority refers to the Sanitarian are these:—

(1) Will adoption of incineration increase the fighting strength which can be placed and kept in the field?

(2) Will this method increase the cost of conservancy, and, if so, to an extent disproportionate to any advantages it may possess?

(3) Is adoption of this method practicable under present conditions?

It is evident that the order of relative military importance, in which these questions have been arranged, must be reversed in the attempt to provide the solutions. An attempt to deal with this important matter in a business-like manner must first demonstrate its practicability; then trials must be secured on a small scale which will afford data for estimating its cost as compared with existing conservancy methods; and, finally, such extended trials must be carried out as will enable reliable information to be compiled, showing its influence upon the sick rate.

Practicability.—This obviously needs no demonstration in the abstract; what we have to consider is, whether we can incinerate with the fuel available, and without causing an amount of offence which will materially interfere with the comfort of those incinerated for.

Can the types already evolved incinerate with the fuel available? Certainly, as regards quality, probably as regards quantity? It is not suggested that they are other than illustrations of stages on the way to perfection, but if moderate funds were placed at the disposal of any one of the recognised experts, that practical perfection would be well in sight in the course of a few months.

Respecting offence, I need only quote the experience of my own headquarter station, in which incinerators have increased year by year since 1908, thus—one, seventeen, forty-eight, sixty. Justifiable complaints were made at first, but they died away as crude open patterns were replaced by closed types; and, as far as I know, the opposition is now confined to one hyper-æsthetic officer, near whose house an incinerator was at work for six weeks before he accidentally discovered it, and, simultaneously, that he could no longer dine in his house unless the incinerator were abolished. As I write,

there are two "Sialkote" type destructors in full blast near my bungalow—one within 40 yards—but none, save the most fastidious, could take legitimate exception to the occasional smell of burning organic matter which results.

The difficulties to be faced in dealing with field service conditions are greater, and especially so with regard to incineration for a force in war time. Not only must portable types be used, and under unfavourable circumstances, but it must be recognized that on active service transport and fuel may be limited, uncertain, or unprocurable. This aspect of the problem has been approached with a full recognition of these difficulties, and the details to be given later will show that there is good reason to believe that they, too, are well on the way to solution.

Comparative Cost.—Extensive trials are now being carried out in many Indian stations which, if organised, would soon provide the necessary data for a sound comparison of the relative cost of this and other methods of conservancy. At present, the reported results form an undigested chaotic mass of non-comparable data defying all attempts at standardisation. Capacity is expressed in terms of persons, lines, gallons, baltis, buckets, or latrines; fuel expended is measured by cart-loads, pounds, cubic feet, stables or, more often, not measured at all; while in very few instances can reliable figures be obtained as to what is perhaps the most important point of all—the amount of fluid which can be disposed of. Control of this experimental work by central co-ordination would ensure that trials were carried out under parallel conditions; that various special points were distributed so that each received its due meed of attention; and would lay down a form of report which would make all results obtained strictly comparable for general reference. The form of report now suggested would give the information required for each incinerator, in terms in which results might advantageously be expressed, thus :—

Station..... Season.....
Type of incinerator.....
Cubic capacity of combustion chamber.....
Average consumption in twenty-four hours of :—
(*a*) Solid excreta of number of persons*—
Europeans.....
Natives
(*b*) Gallons of fluid (allowing 5 ounces per head for urine passed when defæcating)
(*c*) Fuel—variety.....
Pounds.....

* The solid excreta of natives averages 180 per cent. that of Europeans.

These data are necessary for the determination not only of the value of incineration, but also of the comparative values of various patterns of incinerator. Adoption of this, or a similar form of report would furnish this information in as many months as it will take years to collect it under present conditions.

Results would be rendered still easier of comparison if there were appended to the above form the ratio between a unit of fuel burnt—100 lb. being suggested as a convenient unit—and the number of persons whose fæces are consumed and the gallons of fluid disposed of, thus: Per unit of fuel; persons 64; gallons 10.

When the data thus made available come to be considered, the economic aspects of the question whether this method should be adopted will fall naturally under two distinct headings :—

(*a*) Conditions in which excreta and refuse possess definite manurial values, which must be sacrificed, *i.e.*, in cantonment.

(*b*) Conditions in which the manurial value of neither need be considered and both may be advantageously disposed of by the utilisation of refuse for the destruction of excreta, *i.e.*, on field service.

Regarding the latter, the financial equation is simply this: "Is it cheaper to burn or to bury?" If the factors of flies and sickness be included in that equation, the answer will undoubtedly be, "to incinerate."

The Service must leave to ethical experts the decision as to how far it is justifiable to dispose of waste products in the easiest way possible, irrespective of the continuous and unbalanced drain of nitrogen from the soil; we cannot, however, ignore the manurial values of the excreta and litter which it is proposed to dissipate in smoke, and the consideration of those two waste products must be undertaken separately.

It is estimated in England that the value per head per annum of human dejecta is 7s. 4d., of which urine and fæces represent 6s. 8d. and 8d. respectively. The British cultivator has long since realised the trifling value of night soil, which has ceased to have any market value whatever. In India a slower appreciation of the same fact is embarrassing cantonment authorities by depreciating the rentals of trenched lands until, in some instances, all that can be obtained is permission to trench gratis in cultivated areas within cantonment limits. This fact must be faced in conjunction with that of an analysis of the statistics for a quinquennium from all Indian stations with a strength of 500 and over, which showed that in those stations in which no night-soil was trenched within

cantonment limits the enteric rate was only 32 per cent. of that which obtained in stations in which that insanitary procedure was still carried out. These two facts make it obvious that, if only in the interests of economy, some other method than trenching must be sought for the disposal of human excreta, and the alternative lies between biological methods and incineration.

The difficulties which militate against the adoption of biological methods in India have already been briefly enumerated and are frankly admitted. None the less, after an essentially practical experience of those methods, sewage farms, incineration and trenching in India, I have no hesitation in advancing the opinion that the disposal of the effluent from a biological installation on a sewage farm affords a possibility of effective conservancy in the plains without facing a perpetually recurring loss. It would be impolitic at this juncture to discuss the causes responsible for the non-adoption of this method, and the failure even to thoroughly investigate its possibilities—such causes are only too familiar to the Indian sanitarian—but it is permissible to point out that one powerful deterrent is the initial cost of providing the necessary water-latrines, of which the pattern devised by Colonel T. P. Woodhouse is so excellent an example. As biological methods are not the subject of this paper, they may be dismissed without further comment than that it is only the value of irrigation in Indian cultivation which enables sewage farming to present so great a probability of securing a lucrative return on the capital outlay required.

Similarly, it is only the failure of trenching together with the reluctance to embark on heavy initial expense for biological installations which gives incineration any claim to consideration. Slender as that claim is, it depends for its mere existence upon a demonstration of our ability to thus dispose of urine as well as fæces: a dual system of destructors for solids and trenching for urine must clearly involve a heavy, if not a prohibitive, loss. Therein lies the utmost importance of utilizing every thermic unit evolved in oxidation and therein too is involved the condemnation of all forms of "open" incinerator—apart from the valid objection to the foul smells produced by incomplete combustion.

Having got thus far, we are confronted with the consideration whether it be possible to dispose of the urine by evaporation, and thus preserve its valuable solids. It is evident that such a procedure could never pay as a commercial undertaking for this sole purpose, but if an amount of refuse providing the necessary caloric energy must be burnt in any case, it becomes an immediately

practical question whether we cannot devise some means whereby the wasted heat may be utilised to advantage in securing a valuable bye-product. If we can succeed in recovering an appreciable part of the alleged value of such urinary solids, we might thus place incineration methods upon a sound financial basis. The purely commercial side of this matter must, of course, be referred to the manufacturing chemist or the scientific agricultural expert. The practicability of this suggestion has meanwhile been worked out and demonstrated by means of an urine-evaporating tray forming a false roof to the combustion chamber, the details of which will be discussed with those of the newest types of incinerator.

The disposal of litter lacks the urgency attaching to that of disposal of human excreta in that, presumably, infective organisms are absent from the former. In so far, however, as stable litter provides muscidæ with their most favourable breeding-ground, whence swarms of young flies emerge to feed impartially on human excreta and human food, it is essential that the opportunities for the deposition of ova should be reduced to a minimum. As wholesale incineration is impossible without the fuel value of litter, we must obtain an estimate of the loss to Government grass farms if no litter were available as manure. The estimates submitted by the grass farm authorities cannot but be regarded as inflated in the light of the success which attends manuring of grass lands at home. Allowance for the fullest possible influence of Indian climatic conditions still leaves some estimates unacceptable. It is not enough to state that abandonment of shallow refuse trenching would involve a specified heavy loss, diminishing annually for a period of twelve years; what is required to enable an accurate estimate to be made is a careful calculation of how much of the increased yield which follows turning of the soil plus digging in of litter is due severally to each of those factors in the one process. Such a differential estimate has not been forthcoming so far, and the total loss has been attributed solely to the absence of litter.

The practical importance of this point lies in the fact that the essential is a cheap matrix for absorption and distribution of the semi-liquid material to be incinerated. It is thus evident that wood need not be considered, while it is probable that sawdust, which would serve admirably, would prove too expensive—although it would be advisable to obtain quotations in view of the needs of some hill stations, in which fuel is as unobtainable locally as trenching sites. The present position, therefore, is that grass or litter must be used, and the question thus resolves itself—Is the value of

the increased yield of grass consequent on surface trenching of litter, after deducting (*a*) cost of cartage and labour, (*b*) yield resulting from turning of the soil only—less or more than the cost of purchase and delivery at the incinerator of the equivalent combustion value of grass fuel? The lines upon which such an experimental determination could be carried out are obvious, and reliable data could be made available in a single season.

Without the introduction of details, which have been purposely excluded from these initial considerations of the general aspects of this complex problem, it is noted that an index of the matrix and fuel value of litter is afforded by the fact that the newest type of incinerator has disposed of 1·3 lb. of liquid for every 1 lb. of dry litter burnt. This result was actually obtained for the months of July and September—*i.e.*, under monsoon conditions—and expresses the average for those months. Evidence is thus afforded not only of the importance of obtaining litter fuel but also of the extent to which an ample supply of that fuel would render it possible to dispose of urine with safety and, at the same time, obviate the expense of maintaining a dual system of conservancy.

Influence of Adoption of Incineration upon the Sick-rate.—This, the question of first importance from the purely combatant standpoint, is necessarily the last in chronological order of solution. It calls for the briefest consideration at this stage, in that its final solution will only be possible in the light of information secured by extended trials. Failing such demonstration, it is only necessary to consider what reasons the medical authorities can advance for pre-supposing the success of those trials. Without digression into irrelevant considerations the skeleton facts of our arguments, from the scientific standpoint, would appear to be based on our knowledge of infective intestinal disease—of which enteric stands as the type, because of its relative prevalence and, as a corollary, our more definite information of the factors in its causation. The ascertained facts are :—

(1) Enteric infection is derived solely from a previous case of the disease, discovery of the "carrier" having disposed of many, or all, of the difficulties in the way of accepting this belief.

(2) Infection, in so far as it concerns conservancy, occurs by conveyance of the infective organism from the dejecta of a previous case to the alimentary tract of non-immune persons. Infectivity of dejecta has been shown, in the case of the "carrier" and, still more recently, in the enteric case at the very earliest stages of disease, to be far more common than was formerly supposed.

(3) That the conveyance of infection may be effected by flies and, probably, by aerial diffusion of dust.

If these facts be accepted, it follows that the essentials for a conservancy method are that it should ensure the speediest possible destruction of infective dejecta ; afford no access of flies to dejecta; and, as an additional protection, reduce the number of flies to the minimum. In proportion as incineration effects these desiderata better than trenching, to that extent, *ipso facto*, is it the better conservancy method.

There are in addition certain statistical data which contra-indicate trenching, but such evidence must necessarily be, and admittedly is, slender, nor can reliable statistical data be obtained, save by extended trials under parallel conditions as advocated.

Having reviewed the evolution of this problem ; having studied the form in which it is presented to us for solution by the combatant authorities ; and having discussed its general bearings, the way is now clear for a detailed consideration of some of the types of incinerator which have been evolved, and some of the facts which have emerged from their practical trials.

(To be continued.)

United Services Medical Society.

AMBULANCE TRANSPORT.

By Colonel H. HATHAWAY.

A great deal has been heard about the scarcity of horses suitable for the Army. It has been stated that there are not sufficient to meet the requirements of the units, on mobilisation, and that, to make good the wastage of war would be impossible. It is unnecessary to go into the figures that are used to prove the accuracy of these assertions. The reports of this scarcity may be greatly exaggerated. We might hope that they are untrue, but it must be evident to all that for the purposes of commerce, as well as pleasure, motor vehicles are steadily replacing those drawn by horses, throughout this country.

A large number of horses are required, and in the distribution, the fighting units must, of course, receive the first consideration. Cavalry and Artillery, and the means of conveying their ammunition and food necessary to keep them at the front, must first be supplied; so that even if it is possible to provide the horses necessary for the field medical units on mobilisation, there may not be sufficient available to replace subsequent casualties. Under such circumstances the field medical units would suffer in efficiency. So, if it be admitted that there is a scarcity of horses it is most desirable that there should be some supplementary scheme whereby a substitute could be found, at least, in part.

I feel quite confident that the War Office has considered the whole question, guided by an estimate of the number of horses that are likely to be available.

Would it be possible to allow the wounded the luxury of motor transport? Civil hospitals now have their motor ambulances, for the purpose of collecting accidents from the various parts of the districts in which the hospitals are located. It used to be stated that there was an element of uncertainty in mechanically propelled transport, and therefore it was considered unsuitable for military ambulance purposes, but in recent years, this prejudice must, surely, have been broken down, else motors would not have become so very popular. Long distances, in spite of hilly and bad roads, are now accomplished without serious breakdowns, and when mishaps do occur, they are generally capable of rapid repair. In fact, the

majority of makers now turn out cars with engines quite as reliable as a horse.

How far horse-drawn transport should be superseded, depends a great deal on the proportion of horses that are available for the field medical units. The size of the force mobilised would, of course, influence this a great deal. If it were possible to choose, I would certainly employ horse-drawn vehicles for the cavalry field ambulances, and the field ambulances. The transport for the other medical units is provided by the Inspector General of Communications. It would rarely be possible to collect sufficient motor vehicles from the district in the manner that other auxiliary transport is provided.

An estimate of the number of vehicles which would be required could be formed by considering the distance that troops would proceed from the railway, and the nature of the country.

We must study the map, and see if there is a good proportion of hard metalled roads, and if there is a network of small roads giving plenty of opportunity for alternative journeys, and see what the contours are like.

The conditions being favourable, we might make the same allowance as is provided for troops at the front, for example a division has thirty ambulance wagons, each capable of carrying four lying-down cases, or twelve sitting up. There would be more opportunity of sorting out the cases than is possible in the field, so some motor vehicles could be used exclusively for lying-down cases, others for sitting up. Taking into consideration the number of journeys that motor vehicles could perform in a day, the allowance is a very liberal one, but it would permit of them taking the place of part of the horse-drawn vehicles at the front whenever practicable, so that a shortage of horses should not cause inefficiency.

The Deputy Director of Medical Services would allot the motor vehicles to communicate from clearing hospitals, forwards to the field ambulances, and backwards to the rail head, forming convoys of evacuation; this would be a better arrangement than assigning a certain number of motor vehicles to each clearing hospital, for there will often be more wounded requiring carriage in one direction than in another, so the motor vehicles of one clearing hospital might be doing nothing, whilst in another direction there might be insufficient ambulance transport.

No doubt most of the ambulance work in this country could be performed by motor vehicles, fed by stretcher parties. For service abroad, so much would depend upon the nature of the country in which active service was expected.

It may be taken for granted that when it is necessary to use a large army, and a shortage of horses may occur, the roads would be sufficiently good for motor vehicles for a proportion of the ambulance work.

The comfort of the patients carried is of course an important consideration. Where there is so much variety of construction of mechanically propelled transport, there must of course be degrees of comfort in which the sick and wounded can be carried, ranging from slow transit on pneumatic tyres, in which the acme of ease might be expected, to a rapid journey on solid tyres, which is probably more uncomfortable than the movement experienced in an ordinary horsed ambulance proceeding at the regulation pace.

With pneumatic tyres, provided that a patient is really in a fit condition to travel, motor transport causes little discomfort and the journey should be conducted rapidly, where the roads are in good condition, so that some serious cases that may require early operative treatment can be quickly transported from the front to the more fully equipped hospitals on the Lines of Communication, or even to the base where an operation would be practicable. The tedium of the staging, the shifts from the vehicle to the hospital and *vice versa* would be considerably diminished.

Whatever may be the condition of the ground surface over which the vehicles are required to proceed, whether it is rough, unmetalled roads, hills, or even over a ploughed field, it is an unquestionable fact that the transit will be infinitely more comfortably performed in a motor car than in the best of horse-drawn vehicles, specially designed for the carriage of the sick and wounded, provided of course that the driver carefully steers past obstacles and modifies the speed of the motor-car so as to ensure a level spring action with a minimum of jolting. In this form of carriage we have extreme comfort, combined with economy in time, and considerable distances can be accomplished that would be impossible with horse-drawn vehicles.

In transport over-seas to the base of operations the deck space required for a motor vehicle would be considerably less than that necessary for an ordinary ambulance wagon, its horses, and their forage for the journey. Ambulance wagons take up a considerable amount of space on the road, and of course it is necessary to make every effort to avoid any hindrance to the troops marching, and as there sometimes is the greatest difficulty in ambulance wagons going forward when required, instructions are given to use alternative roads as much as possible.

Consider the wide detour that it would be possible for motor vehicles to make, going quickly when empty, if they found one road blocked they would have plenty of time to try another. They could be kept well away from the zone of fire until required, and then when signalled for they would appear with utmost rapidity, avoiding roads by which troops might be marching.

The question of expense will doubtless be considered by many as a serious drawback to the possibility of extensively employing motor vehicles for ambulance purposes. Nobody could reasonably suggest that they should be purchased by the Government, to be kept ready for use; that indeed would be an expensive scheme. They should be called up as required only. There would then be no waste by them lying idle in peace time; on the contrary, there would be the strictest economy in a system which would enable motor-cars used for the purposes of commerce or pleasure to be taken up and converted for ambulance purposes when mobilisation for war takes place. In rapidity of pace we have economy in the number of vehicles required, for each motor-car can go several return journeys. In the long distances possible, there is economy in the number of hospitals required for road posts, for they might be quite the distance apart that is usual on the railway, that is to say, twenty-five miles instead of every ten miles. Motor ambulances would make good the distance between field ambulances and clearing hospitals, and would be particularly valuable when troops are advancing rapidly, pursuing the enemy, and the field ambulances have to advance cleared of wounded. It is possible that sometimes motor-cars would be unable to leave the road for the purpose of collecting wounded, or for proceeding into a camp, on account of the ground being too cut up and soft to permit of vehicles moving through the mud and wheel ruts. Recent experiments show that there is little difference between motors and other vehicles in this respect.

I do not consider that this will form a substantial reason for not employing motor-cars for ambulance purposes. The difficulty could always be met by stretcher parties carrying the wounded to the vehicles on the road.

When possible both large and small motor-cars should be employed for ambulance purposes of transport, so that there should not be an unnecessary expenditure of power by a large vehicle carrying only a few men. We expect to find about 80 per cent. of the wounded able to sit up, and the remainder requiring transport lying down; so it is an economy of time and carrying power, if a vehicle

can be fashioned to carry both sitting-up and lying-down cases, except perhaps for the wounded of mounted troops, who, if able to sit up, are often comfortable enough on their own horses until they find a vehicle for the accommodation of sitting-up cases.

Motor omnibuses are usually two-decked of about five horse-power, and carry thirty-four seated.

The char-à-banc is usually made about twenty-eight horse-power, and accommodates twenty seated.

Both forms of vehicles would be extremely useful for ambulance purposes, always provided that there are well-metalled roads available. Last year I heard of a motor omnibus being used to replace a four-horsed coach for taking tourists round the country. It soon had to be abandoned because the wheels sank through the thin metalling of the country road.

When the roads are good motor omnibuses could be sent to the points where the slightly wounded are collected or lighter vehicles could be first used, meeting the omnibuses where the roads were hard enough.

If the mechanical transport which takes stores to the front is used on the return journey for conveyance of wounded, it should carry, packed away, apparatus suitable to form sitting and lying-down accommodation for the wounded, that is folding benches and racks for stretchers. None of these vehicles can carry anything like the number of lying-down cases, proportionate to their size, and the horse-power of their engines.

The wheels of the larger vehicles are fitted with solid tyres, which would be sufficient for the comfort of cases sitting up, and for some of the lying down. Vehicles with solid tyres should not carry sitting-up cases faster than 8 miles an hour, lying-down cases at walking pace.

Some four-seated touring cars have the backs of their seats level, so that without any alteration or additional apparatus, they could carry one case lying down on a service stretcher, and one attendant sitting behind the driver.

The loaded stretcher would be placed in position from the back of the car, the Cape cart hood having been lifted up for the purpose; the stretcher would be secured to the uprights of the hood by its slings.

It is obvious that the carriage of only one lying-down case in a motor-car is a great waste of engine power. In a taxicab there is not even space enough for one case lying on a service stretcher. The driver requires plenty of room, and if the body of the vehicle

was sufficiently enlarged the taxicab would be too clumsy for use in London. It therefore comes to this, that touring cars and taxicabs would do admirably for the conveyance of sitting-up cases, but some other arrangements must be made for those requiring lying-down accommodation. The best plan would be to remove the body-work of the touring cars or taxicabs from the chassis. Cars having petrol tanks separate from the body should be selected. A platform and framework for ambulance purposes, could be fitted after the bodywork had been removed, whatever the shape of the chassis, the position of the wheels would be of little consequence as far as the fitting up of the platform is concerned, for it would be blocked up upon the framework sufficiently above the wheels to allow spring under full weight carried. The platform would be of sufficient size to allow of two opened-out service stretchers being carried on it side by side. The framework could be made of angle and T iron, and would support two more service stretchers above those on the platform, so that four patients would be carried lying down, or two lying down and four sitting up, or eight sitting up.

To scrap large numbers of ambulance wagons at present ready for use and replace them by mechanically propelled vehicles would be altogether out of the question on the score of expense.

It might be possible to form a motor ambulance reserve dependent upon the loyal support of owners of cars, who would place them at the country's service in war time.

This might form a very useful section of Red Cross Voluntary Aid. Even if this scheme were well supported a much larger supply would be necessary, especially if motor-cars are to be used in wars over-seas. The best plan would probably be to subsidise commercial firms for the supply of motor vehicles in war time.

A specification to which a large company making and maintaining taxicabs in London should adhere, must necessarily be on broad lines, for the range of work their cars may be called upon to do is great. They must be light so as not to cause excessive tyre consumption, and still be rigid if they are to be of use in field work. Low gear is not essential in London, but a car without it of the horse-power of a taxicab, could not carry its load over rough country. The drivers, who understand the machinery of their own cars, and its working, would in every case accompany their own motors.

I do not propose to go into any detail with regard to the engine, its bore, or stroke. A four-cylinder of fifteen horse-power would be

about what is required, all the parts should be as simple as possible and easy of access.

In estimating the value of motor vehicles for ambulance purposes, it is well to remember that it may not be so much a matter of choice as of necessity. If it be admitted that horses will not always be forthcoming, then a substitute must be found, and we are extremely fortunate in being able to turn to the motor-car, with all its substantial advantages.

We shall probably, at any rate for a time, use a proportion of horse-drawn vehicles, discarding them as experience demonstrates it to be practicable; we shall have a call on a certain number of motor-cars, of which 20 per cent. will be prepared for lying-down cases, and whenever the roads are good enough we shall probably employ motor-omnibuses, or possibly ambulance vehicles drawn by light traction engines.

I have had the opportunity of taking expert opinion about this, and I understand that it would be quite practicable to fit couplings on to any of the ambulance wagons at present in use, so that horses could draw them part of the way, and then two or three of them could be coupled to a light traction engine for the remainder of the journey. I am also informed that a strong motor-car of about twenty-horse-power, of low gear, with solid tyres, could draw ambulance wagons; this would certainly be a simpler arrangement than that of converting the car for lying-down cases.

I feel that I have been speaking to you on a subject in which I take a great interest, but can necessarily claim little experience, for it is new to all of us.

There is much more to be said in this matter. I have brought forward a few ideas that strike me as being important for your discussion.

DISCUSSION.

Major Crofton Atkins, A.S.C., said that the War Office had of course had the matter of motor transport in general under serious consideration for some time; probably the best solution of the problem would be the subsidising of cars with a standard chassis; these would be registered and would be available for military purposes in case of mobilisation. It was doubtful if motors could be much used away from roads, but on roads he thought that there was no doubt that they would add greatly to the comfort of the wounded, as well as facilitate the more rapid clearing of the front.

THE SYMPTOMS AND MODERN METHODS OF DIAGNOSIS OF STONE IN THE BLADDER, KIDNEY, AND URETER.

By Lieutenant-Colonel P. J. FREYER,
Indian Medical Service (Ret.).

The subject to which I propose inviting your attention, viz., "The Symptoms and Modern Methods of Diagnosis of Stone in the Bladder, Kidney, and Ureter," is not, like most subjects discussed at your meetings, exclusively or, indeed, peculiarly identified with those conditions under which as Service men you practise your profession. The diseases dealt with are, however, so widespread in their incidence that no apology is necessary for bringing their discussion within the scope of this Society.

Renal Calculus.

Pain in the loin corresponding to the affected kidney is, as a rule, the earliest, as it is the most constant symptom. In the primary stages of the malady the pain assumes the form of periodic attacks of what is commonly known as "renal colic." In a typical attack of this kind the pain commences in the loin, then shoots down the corresponding groin, along the course of the ureter, into the bladder, and frequently into the testicle in the male, or *labium majus* in the female. The testicle is generally retracted, and may be swollen and tender. The pain may also radiate down to the thigh, and across the abdomen towards the other kidney. Generally speaking, the pains radiate along the branches of the lumbar plexus of nerves.

The pain varies in intensity in different individuals, and at different periods in the same person. It is sometimes slight, or of moderate degree; more frequently it is excruciating, causing the patient, bathed in profuse perspiration, to roll about in agony, making ineffectual attempts to ease his distress by change of position. It may be so severe as to necessitate frequent hypodermic injections of morphia, or even the employment of a general anæsthetic for its relief.

The attacks of renal colic are almost invariably accompanied by gastro-intestinal disturbances, namely, nausea, vomiting, and perhaps purging.

They are also, as a rule, attended by reflex disturbances of the

urinary tract, viz., pain or scalding in the urethra, increased frequency of micturition, scantiness, or even partial suppression of urine, due either to obstruction to the flow of urine or inhibition of the functions of the affected kidney, or even of the sound kidney, on the other side.

As the attack passes off the kidneys resume their functions, and immediately on its subsidence the volume of urine is greatly increased.

The attack of renal colic may pass off in an hour or two or continue for two or three days. Sometimes it comes to an abrupt termination by the stone passing down the ureter and out through the urethra. Or the stone may be arrested in the bladder, a new train of symptoms, namely, those of vesical calculus, setting in.

As the disease progresses the intervals of freedom from suffering diminish in length, and the accessions of lumbar pain, as a rule, increase in intensity. But eventually, after the malady has lasted for a lengthened period, perhaps two or three years, the typical renal colic attacks gradually subside, to be replaced, however, by pain of a dull, heavy, aching, or gnawing character fixed in the loin.

Now, how is this change in the character of the pain accounted for? It is attributable to the following circumstances: When the stone is small and lies loosely in one of the calyces, by some sudden jar or movement of the body it is shaken into the pelvis, and is forced down the ureter by the accumulation of urine above. Obstruction to the flow of urine and pressure on the nerves are thus caused, giving rise to the distressful condition already described, till, by some movement or position of the body, the stone gets displaced backwards again, when the symptoms suddenly cease.

As the stone grows in size it has a tendency to get fixed in one of the calyces, thus ceasing to block the ureter and obstruct the flow of urine; or, lying in the pelvis, it may gradually throw up coral-like branches into the calyces like these specimens, which I show you from my own practice, one of which recalls to you Henle's cast of the pelvis and calyces of the kidney. When calculi attain this size they, as a rule, cause little pain while the patient is at rest, owing to the fact that they are fixed in the kidney and probably surrounded by thick muco-pus. A very large stone like one of these specimens can occasionally be felt on palpation through the loin.

A typical, almost pathognomonic, characteristic of the pain due to renal calculus, is that it is brought on or increased by exercise, particularly riding on horseback, and diminished by rest.

When the attacks of renal colic have continued for some time, another symptom of not less significance, namely, hæmaturia, sets in. Sometimes, though rarely, periodic hæmaturia may be the first symptom noticed by the patient, the lumbar pain supervening later on.

The hæmaturia occurs in connection with the attacks of renal colic, setting in shortly after the pain commences and continuing some hours, perhaps a day or two, after it ceases, the urine then becoming gradually clear, and remaining so till the next accession of pain.

As a rule, the quantity of blood passed is not large. Profuse hæmorrhage is not characteristic of renal stone. The urine will vary in colour, according to the proportion of blood it contains, from a faint pink to a deep red. Frequently in patients suffering from stone in the kidney, when the urine is quite clear to the naked eye, traces of blood will be discovered by the aid of the microscope.

Like the pain of renal calculus, it is typical of the hæmorrhage that it is increased by exercise and diminished by rest. It is in the early years of the disease that this symptom is most marked. In the later stages, when the stone has grown to such a size that it is fixed in one of the calyces or embedded in the kidney substance, and enveloped by thick muco-pus, there is rarely any hæmaturia, unless the patient be subjected to severe jolting or direct pressure on the kidney.

With the presence of these two characteristic symptoms—pain in the loin and hæmaturia—your suspicions will at once be directed to the existence of stone in the kidney; and on palpation of the loin it will probably be found, if the disease has existed for some time, that there is a tumour in this region of the abdomen, reniform or ovoid in shape, smooth on the surface, more or less moveable, but bound down or anchored behind. On deep inspiration it will probably move downwards to the extent of an inch or more, returning upwards partially under the ribs on expiration. This tumour is, of course, an enlarged kidney, due to congestion or inflammation of that organ from the irritation of the contained calculus. In thin subjects, and particularly in woman, this enlarged kidney will be easily and distinctly felt. If the fingers of one hand be pressed deeply in the loin, and those of the other be placed on the abdomen in front below the ribs, you will probably be able to roll the tumour slightly about its fixed point. In fat subjects, and when the kidney is placed high up under the ribs, as it sometimes is, it will often be impossible to feel the enlarged

organ. In the early stages of the disease, before congestion or inflammation of the organ has set in there will be no tumour felt, the kidney not being sufficiently enlarged to render its presence manifest on palpation.

During these manipulations another important symptom will be elicited, namely, tenderness in the loin; this will in some cases amount to acute pain. Nausea will also probably be induced by palpation of the kidney.

Even in the early stages of the malady, when there is no apparent enlargement of the organ, palpation of the loin will elicit tenderness at some particular spot. A characteristic symptom of renal calculus is a sharp stabbing pain felt when the fingers are pressed deeply in the ileo-costal space, just outside the margin of the erector spinæ muscle. A somewhat similar pain is produced by pressing the fingers into the abdomen at a point midway between the navel and the anterior superior spine of the ilium, indicating probably that the stone lies in the pelvis of the kidney or its vicinity.

Turning our attention now to the urine, apart from the presence in it of blood already dealt with, in the early period of this disease you will frequently discern the existence of albumin. In the later stages this is invariably found. Pus in the urine is an important symptom. Though generally absent in the early history of renal calculus, it is almost invariably present in the later stages of the disease, due to the pyelitis or suppurative nephritis set up by the irritation of the stone. As a rule, the urine is acid in the presence of this pus, but occasionally it is alkaline. When the stone has existed for years, has attained large dimensions, and has caused much destruction of the kidney tissue, pus may be passed in enormous quantity. Under such circumstances there will be febrile disturbances, profuse sweats, with loss of flesh and strength.

Mucus is frequently present in large quantity where the urine contains pus as the result of stone in the kidney. In the early stages of renal calculus in young persons mucus may be present without the existence of pus.

Microscopically, crystals of uric acid, oxalates, or phosphates will probably be found, and, apart from the significance of this symptom as confirmatory of the presence of stone in the kidney, will give a clue as to its composition.

These, then, are the symptoms of renal calculus. It is rare that you will find them all present in any particular case. A combination of a certain number of them will afford you ample grounds for

arriving at a correct diagnosis. Calculi embedded in the cortical portion of the kidney may exist for years, and give rise to no symptom beyond, perhaps, some aching in the loin.

There are, however, some cognate considerations that will assist us in arriving at a correct diagnosis. For instance, the previous passage of one or more calculi would be a strong confirmatory indication of renal calculus.

Then again, you should inquire as to whether there is any history of injury to the kidney, for traumatism, when accompanied by the effusion of blood into the substance of the kidney, is not unfrequently followed by the development of stone.

If the patient has resided in a locality favourable to the formation of stone, this should be taken into consideration. It is well known that residence in certain localities, such as Norfolk, strongly favours the development of urinary calculi.

Lastly, heredity should be inquired into, for stone and those diatheses that favour its formation are hereditary in families. In 1899 I successfully removed renal calculi from a young artillery officer and his mother; and the father of this lady had died from stone. Some years ago, in India, I removed by litholapaxy calculi from three generations—son, father, and grandfather.

The Roentgen rays have been much employed in recent years for the purpose of diagnosing renal calculus, and with remarkable success. This method of diagnosis has now been brought to such perfection that only in exceptional circumstances should a surgeon explore the kidney for stone unless its presence has been confirmed by a competent radiographer. When the stone is large, and particularly when it is composed of oxalates or phosphates, which give a dark shadow picture, the results are as a rule satisfactory. They are less so when the stone is uric acid, owing to the shadow being less defined or absent. The circumstances which militate against the success of this method of diagnosis are: The stone being small, the patient being stout, the movements of the kidney during respiration blurring the image, the shadow cast by the stone being concealed by that of the bones and the calculus being uric acid—any one or more of which may render the method nugatory. When a distinct isolated shadow of the shape of a stone is shown, you may be pretty certain that there is one present, unless the shadow be caused by an intestinal concretion or calcified tuberculous gland. But negative evidence as to the presence of a stone by the X-rays should not deter you from exploring the kidney by operation when the symptoms of stone are well marked.

Cystoscopic examination in doubtful cases is frequently helpful. Not alone does it enable us to definitely exclude bladder conditions as the cause of the symptoms, but it may give us positive evidence of the presence of stone in the kidney. For in this malady the ureteral opening on the affected side is frequently distorted, irregular, puckered, pouting, or displays a prolapse of the ureteral mucous membrane — conditions due to the constant straining to get rid of the stone. Besides, we may observe blood or pus issuing with the urine from the ureter, especially if the affected kidney be squeezed between the hands of an assistant.

Vesical Calculus.

The classical symptoms of stone in the bladder are four in number: (1) increased frequency of micturition; (2) pain in connection with the act of urination; (3) hæmaturia, and (4) sudden stoppage of the flow of urine.

If a patient suffers from these four symptoms you should at once suspect the presence of a stone in the bladder. If, in addition, you ascertain that previous to the setting in of these symptoms the patient had passed one or more small calculi, possibly preceded by attacks of renal colic, your suspicion will grow into a practical certainty that there is a stone in the bladder. If the symptoms have existed for a lengthened period you will probably find that the urine contains pus and mucus, due to the cystitis set up by the presence of the stone. It must be remembered, however, that a urate or even an oxalate of limestone may exist for years in the bladder without causing cystitis, in which case the urine would be clear and acid. A phosphatic calculus is invariably attended by pus and mucus in the urine.

A stone may be found with any three of these symptoms, any two, or even any one of them. A large calculus may even be present in the bladder and give rise to none of these symptoms. This urate stone which I show you, the *débris* of which weighs 3 ounces, I removed successfully by litholapaxy from a young man of 20, and he assured me that till six months before coming under my care he had been troubled by no urinary symptom. Still, this calculus did not grow in six months; it was the product of years; so that the patient must have carried it about in his bladder for a lengthened period without any inconvenience.

On the other hand, very similar symptoms to those I have indicated may exist and no calculus be present, simply from the fact that these symptoms may be produced by some other disease

than stone. Let us, therefore, examine these four symptoms individually, and see what are the peculiar characteristics of each of them when due to stone.

(1) Increased frequency of micturition is the earliest, as it is the most constant symptom of stone. The bladder becomes irritable—frets, as it were—at the presence of its unwelcome and unnatural tenant. This, like most of the symptoms of stone, is aggravated by exercise and diminished by rest. Consequently, it is less frequent at night, when the patient is lying down, than in the day when he is going about, exactly the reverse of what occurs with enlarged prostate—a point of diagnostic importance.

(2) The pain which is almost invariably present with stone is, strange to say, rarely referred to the bladder itself. It is reflex in character and situated near the end of the penis, at the posterior aspect of the glans, most frequently in the position of the frænum. It occurs, as a rule, in connection with the act of micturition, setting in, and gradually increasing in intensity, towards the end of the act, as the bare walls of the bladder come in contact with the stone; and it gradually disappears as the bladder refills, the urine acting as a buffer between the stone and the bladder wall. But any form of exercise, such as walking, riding, or jolting in a carriage over rough roads will bring on the pain. It is described variously by different individuals as of a scalding, aching, or lancinating character. A patient of mine once described it as a sensation as if the penis were being broken off. The pain diminishes in intensity as life advances, being much more excruciating in children than in aged persons. There is nothing more heartrending to behold than the suffering of a little child afflicted with stone, as he dances about the floor during and after micturition, shrieking with agony and pulling at his foreskin (which becomes elongated and probably ulcerated), trying to relieve the pain.

(3) The hæmaturia attendant on stone, though neither the earliest nor the most distressing symptom, is that which usually most alarms the patient and induces him to seek medical advice. It presents three characteristics: (i) It comes on gradually, sudden or profuse hæmorrhage not being indicative of stone; (ii) it generally occurs towards the end of micturition, the earlier portions of the stream being clear, the later portions being tinged with blood, and winding up with a few drops of pure bright blood; (iii) exercise increases and rest diminishes the liability to its occurrence. After active exercise the urine will, as a rule, be uniformly tinged with blood.

(4) Stoppage of the flow of urine is the least common of these symptoms, and is due to the stone falling against or plugging the inner orifice of the urethra. It is much more common in the earlier than in the later stages of stone, whilst the latter is still small.

Such, then, are the characteristic features of each of these four symptoms of stone. There are, however, as I have already said, many other diseases of the urinary tract which present somewhat similar symptoms. Let us examine these latter and see what peculiarities they possess which will help us towards a diagnosis :—

(1) Increased frequency of micturition by itself, apart from one or more of the other symptoms described, is of little diagnostic importance. It may occur with almost any disease of the urinary tract, and, indeed, in perfect health, under the influence of certain drugs, the ingestion of various kinds of food and drink, or with the sudden setting in of cold or damp weather, owing to the increased work thrown on the kidneys from the action of the skin being checked. It is when taken in conjunction with one or more of the other symptoms that it is of consequence as a diagnostic feature of stone in the bladder.

Vesical calculus is extremely rare in females as compared with males. But two of the symptoms of stone, viz., increased frequency of micturition and pain, are very common in women. These two symptoms are in the great majority of cases due to some flexion, enlargement, or inflammatory state of the womb, causing pressure on the bladder. Vascular caruncle of the urethra is also a not uncommon cause of these symptoms.

(2) The reflex pain referred to the end of the penis, already described, used to be regarded as pathognomonic of vesical calculus: but recent observations, and particularly the extended use of the cystoscope, have shown that it occasionally occurs in connection with other conditions—viz., stricture of the urethra, enlarged prostate, tubercle or calculus in the prostate, local cystitis, ulcer of the bladder, or pendulous tumour falling against the neck of the bladder, clots of blood or thick tenacious mucus lying at the inner orifice of the urethra and obstructing the passage; also, though rare, stone in the ureter or pelvis of the kidney.

The pain attendant on stricture, when it does occur, accompanies the act of micturition and is felt at the seat of the stricture; the pain in connection with enlarged prostate precedes the act, and is, as a rule, referred to the hypogastric region; whilst the pain of vesical calculus follows the act of urination, and is felt behind the glans.

For the further diagnosis of stone from enlarged prostate you will have the advanced age of the patient in the latter disease, the frequency of micturition greater at night than in the day time, and the rectal conditions on examination to guide you. It must be remembered, however, that the two diseases frequently co-exist, stone being very common in prostatic patients. When much irritability of the bladder, pain during micturition, and hæmaturia occur in such a patient, the presence of stone should be suspected.

(3) Hæmorrhage between the acts of micturition must come either from the urethra or prostate, usually the latter.

In tumours of the bladder the hæmorrhage is more profuse than with stone, painless as a rule, the urine is uniformly mixed with blood, and contains large irregular clots, and perhaps portions of tumour *débris*, visible by the microscope or even to the naked eye.

The hæmaturia of tuberculosis of the bladder much resembles that of stone, but the family history and the possible co-existence of tubercle in other organs, will, as a rule, help us to a diagnosis. There is no other disease the symptoms of which so nearly resemble those of stone as tubercle of the bladder, and it will frequently be impossible to diagnose between them without the aid of the sound or cystoscope.

"Endemic hæmaturia," due to the presence of the *Bilharzia hæmatobia*, is, as a rule, painless, though occasionally cystitis accompanies it. The cause of the bleeding will be suspected when the patient has lived in a country where the bilharzia abounds, namely, Egypt, Abyssinia, Natal and the Cape. Diagnosis is confirmed by the cystoscope, or when the ova are found in the urine by the microscope.

In hæmorrhage from the kidney the urine is uniformly mixed with blood, frequently smoky or porter-like in colour, and often contains dark vermiform clots, the casts of the ureters.

(4) Sudden stoppage of the flow of the urine may also be caused by a pendulous tumour of the bladder or prostate dropping against the inner orifice of the urethra, by a foreign body, clot of blood, lump of thick inspissated muco-pus, or *débris* of growth. This symptom may also be due to the prolapsed lower end of a ureter containing a stone. I have met with several instances of this kind, and one in particular, where, to overcome the difficulty caused by the prolapsed ureter plugging the urethral orifice, the patient had to lie down before he could micturate or to pass a catheter.

Having thus analysed the characters of the various symptoms, and having come to the conclusion that the weight of evidence

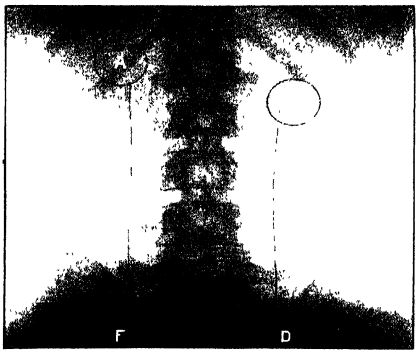


FIG. 1. To illustrate the normal relationships of kidney and ureter to the lumbar vertebræ.

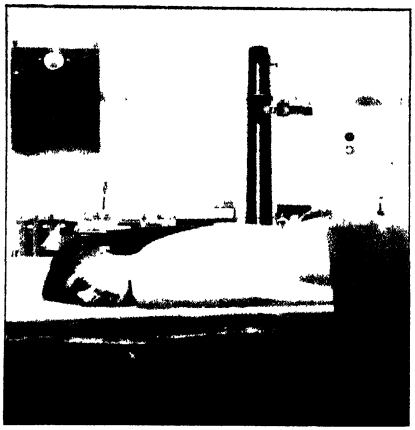


FIG. 2. Position of patient for renal examination.

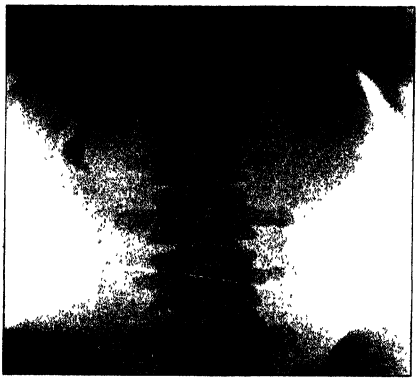


FIG. 3.—To illustrate a radiogram of good quality, and showing a large branching oxalate calculus in the kidney.



FIG. 4. To illustrate three calculi in the kidney: One in the pelvis, one at the lower pole, and one in the substance.



FIG. 5. To illustrate calculi in the ureter in the position marked ←: One encysted in bladder wall, one in ureter.



FIG. 6.—To illustrate vesical calculus seen in position marked ←.

To illustrate "The Symptoms and Modern Methods of Diagnosis of Stone in the Bladder, Kidney, and Ureter."

By Lieutenant-Colonel P. J. FREYER, M.D., M.Ch.

points to the presence of stone, you will proceed to sound the patient to confirm your diagnosis. But no matter how strongly the symptoms point in this direction, you should on no account give a definite diagnosis till the stone has been felt, or seen by the cystoscope.

A patient is best sounded when lying on a high couch. He lies on his back, with his head on a pillow, his lower limbs being flexed and slightly abducted. The bladder should contain two or three ounces of fluid; if it be empty this quantity of warm boracic solution should be slowly introduced through a soft catheter. As a rule, in the adult an anæsthetic will be unnecessary, but it should always be employed in children, and it will sometimes be necessary in the adult, particularly in prostatic patients.

I show you here several kinds of sounds. There is nothing superior to the simple solid steel sound, known as Mercier's, with its short, well-curved beak and bulbous end. That which I generally employ in adults is number 6 of the English scale in the shaft and 10 in the bulb; for children, number 3 in the shaft and 5 at the bulb. Another useful form of sound is that employed by the late Sir Henry Thompson. The cylindrical enlargement on the handle increases the tactile sensation, and being hollow, fluid can be withdrawn from, or injected into, the bladder without removing the sound.

Standing on the right side of the patient you hold the sound—previously sterilised, warmed and lubricated—horizontally by the right hand and insert its beak through the meatus, pulling the penis slowly on to it by the fingers of the left hand. The sound is gradually elevated as it slides down the urethra to the vertical position. By gently depressing its handle between the thighs the beak will be found to slip along the membranes and prostatic portions of the canal and into the bladder. In a large proportion of cases, if a stone be present, it will at once be recognised by the grating sensation elicited as the sound enters the bladder, for the stone generally lies close to the inner orifice of the urethra. If not, the beak is pushed on to the distal part of the fundus, and then, as it is slowly withdrawn to the neck of the bladder, it is rapidly but lightly rotated in a half circle, so that its point taps the bladder walls on either side. This process may be repeated several times. We should be careful at this stage, particularly in children, not to mistake the bony ischial spine for a stone. The handle is now depressed between the thighs and the beak rotated downwards,

and gradually withdrawn with a rotary motion from side to side towards the neck, thus searching the floor of the bladder immediately behind the prostate. Every part of the bladder is searched in this methodical manner. Finally the sound is held almost perpendicularly, with its beak resting on the trigone. It is then lifted slightly off the base of the bladder, and the beak shaken rapidly, but lightly from side to side. By this manœuvre I have frequently detected the faint grating or tinkling of a tiny stone which would otherwise have passed unobserved.

In women it will sometimes be found that the bladder is divided into two lateral cavities by a median ridge produced by pressure of an enlarged womb from behind—saddle-bag shaped, in fact. The beak of the sound must be directed first into one and then into the other of these cavities, which should be methodically searched.

It will be found, however, that in the most experienced hands a small stone lying in some peculiar position—such as in a depression behind an enlarged prostate, in a cyst, between the folds of a rugose bladder, or when covered by thick adherent muco-pus, will sometimes evade detection. The discovery of these small calculi, before they grow into large ones, is of vital importance, as their removal by the lithotrite is practically unattended by danger.

In the *Indian Medical Gazette* of March 1884, I drew the attention of the profession to a new method of diagnosis for small calculi by means of the aspirator and cannula employed in Bigelow's operation. The largest cannula that will pass into the bladder with ease is introduced and the aspirator applied. Water is then pumped into the bladder and exhausted, the process being repeated again and again, whilst the eye of the cannula is moved about in various positions and directions, so as to explore every nook and cranny of the viscus. If a small stone be present it will almost with certainty be drawn with force to the eye of the cannula, and its presence will be revealed by the click or tinkling sound produced by its impact against the metal tube. Further, if the stone be a small one it may pass through the cannula into the glass receiver, without the necessity of crushing it. This method of diagnosis was first suggested to me by the sounds produced by the fragments clicking against the eye of the cannula during the operation of litholapaxy. I have since diagnosed many calculi by this simple method when all others have failed. Its practical advantages were at once recognised by many distinguished surgeons, particularly by my colleague the late Mr. Reginald Harrison, in his published writings, and it is now generally employed.

When, however, a stone is fixed in position, whether in a narrow-

mouthed sac, wedged in between the prostate and the bladder wall, or sticking in the ureteral orifice—as a stone occasionally is in its passage from the kidney—even this method of diagnosis may fail. In obscure cases of this kind the cystoscope, which has proved of such inestimable value in the diagnosis of tumours and other obscure diseases of the bladder, will probably reveal the presence of the stone.

The X-rays may also be employed with advantage for ascertaining the presence of a stone in the bladder, but they are not so indispensable as for renal or ureteral calculus. They will not show whether a stone is free in the bladder or sacculated, an essential point in regard to the operation desirable. This point can, as a rule, be decided by the sound, and with still greater certainty by the cystoscope.

Finally, when all these methods of diagnosis fail to verify the presence of a stone, and the symptoms persist, it may be advisable to open the bladder, either perineally or suprapubically to ascertain their cause. The latter method will, as a rule, be the preferable one, as it enables us to both feel and see the conditions existing inside the bladder and at once to remove the cause of the symptoms.

Ureteral Calculus.

The symptoms of renal and vesical calculus are generally well defined and characteristic. Those of stone in the ureter are, as a rule, very obscure. Indeed, it is only when the stone is impacted in the lower end of the ureter that a definite diagnosis can be ventured on without the aid of radiography.

The situations in which a ureteral stone is most likely to get impacted are: (1) at a point 2 inches from the commencement of the ureter; (2) at the brim of the pelvis; and (3) at the vesical end of the canal.

When we speak of renal calculus, we include not only one embedded in the substance of the kidney, but also one lying in the pelvis of that organ. And this being so, I know of no symptoms by which we can, with anything approaching certainty, distinguish between a kidney stone lying in the pelvis and one impacted in the ureter at any position above an inch or two from its vesical orifice. The symptoms of a stone lying in any position along the greater part of the course of the ureter are, to all intents and purposes, the same as those of a stone lying in the renal pelvis and obstructing the ureter. Sometimes a stone impacted in the ureter gives rise to pain and tenderness on pressure at this spot, and this combined with other symptoms may lead us to suspect

the nature of the malady. But the probabilities are so strongly against a definite diagnosis that till recently the recognised rule of surgery in all such cases was to explore the kidney for stone in the first instance by the lumbar method, and if not found then to examine the ureter by a bougie or probe passed down through the pelvis ; and if a stone was then found, to extend the lumbar incision sufficiently far to enable one to reach the stone and extract it.

With the aid of the X-rays in competent hands we are now, however, enabled to definitely fix the position of the stone and approach it directly at that spot.

When the stone is impacted in the lower end of the ureter, it generally admits of recognition by the finger introduced through the rectum in the male or the vagina in the female, deep pressure above the probes being made by the other hand, as a hard nodule lying beyond the trigone of the bladder.

When the stone is impacted in the vesical end of the ureter and partially projecting into the bladder its presence can be easily recognised by the cystoscope.

In connection with Colonel Freyer's paper, Dr. Ironside Bruce read a short paper on X-ray examination of the urinary tract, illustrated by radiograms.

Dr. Bruce said :—

"The methods of carrying out an X-ray examination of the urinary tract differ in many respects, and there can be no doubt that in the hands of each originator his own method yields the best results, but in making such examinations it is, in my opinion, absolutely necessary that some definite system[1] should be followed. Having employed for some time, both at Charing Cross Hospital and St. Peter's Hospital, a system which has proved satisfactory, but which, nevertheless, I am sure is capable of further improvement, it has occurred to me that the method employed at these institutions might be of interest to you. I propose, therefore, without entering into unnecessary technical details, to indicate to you the essentials of the methods I employ, and to show you some of the results.

"Taking the X-ray as produced and looking upon it as a source of light emanating from a point afterwards referred to as the anode of the tube, the radiogram is a shadow cast upon a photographic plate of those parts of the body that are opaque to the X-ray.

"With ordinary light, shadows may give very false impressions of the objects which cast them, and in the case of X-ray shadows of the renal region this fact claims specially to be borne in mind. If

[1] "A System of Radiography, with an Atlas of the Normal," by Ironside Bruce. H. K. Lewis.

these X-ray shadows are to be used as a means of recognising any existing abnormality it is surely necessary as a preliminary that an accurate knowledge of the normal X-ray appearance presented by this part should be acquired. In order to gain this knowledge, it is of the greatest importance that the shadow secured of the part should be always the same—that is, the anode of the tube should always bear the same relation to the part at the time of irradiation. The method I employ allows of the anode of the tube being placed readily and easily in accurate anatomical relation to the part to be examined by means of a very simple mechanical contrivance, and in dealing with the renal region it is placed immediately below the spine on the second lumbar vertebra. In every case this relation between the anode of the tube and the spine of the second lumbar vertebra is maintained, and, since the kidneys and the ureters usually bear a definite relationship to the bones of the part, a radiogram showing up these structures would demonstrate the shadow relationship they bear to the bones. To obtain a certain knowledge of these relationships the pelvis of the kidneys and the ureter of a *post-mortem* subject were injected with an emulsion of bismuth, which is opaque to the ray. A radiogram was then secured of the renal region of the subject, the anode of the tube being in the usual relation to the second lumbar vertebra. By means of this radiogram the shadow relationship of the kidneys, right and left, and of the ureters was worked out, and in the radiogram (fig. 1), that relationship is distinctly indicated. The circles A and B — the pelvis of the kidneys and the lines C D and E F — line of the ureters.

"The position of the subject is also of some importance. The patient is placed, lying face downwards with his arms by his sides, on a canvas-topped couch, under which the tube is arranged, and in order to restrict, as far as it is possible to do so, the movements of the diaphragm and consequently of the kidneys, a pad or compressor, composed of pure wool, roughly conical in shape with a flat base, and measuring 7 inches × 5 inches, is placed under the abdomen, with the whole weight of the patient resting upon it. The compressor pushes the abdominal contents away from the renal area and allows the more perfect illumination of these parts. The position of the patient on the couch is as to be seen in the photograph (fig. 2).

"It is often difficult to secure a radiogram of good quality, sometimes on account of the density of the subject and sometimes owing to the vagaries of the patient. The latter is usually overcome by frequent examinations or by administration of an

anæsthetic. With regard to the first-named cause, it is not always the most obese object that is the cause of failure; more often it is the stout subject with considerable muscular development. The use of an abdominal compressor, combined with frequent examination and effective evacuations of the intestine, usually results, however, in a radiogram of good quality, even in the most obese subject. A radiogram of good quality should show the following points: It should be absolutely symmetrical; the lumbar vertebra should be sharp and distinct in outline; the margin of the psoas muscle easily made out; the twelfth rib well defined; and the outline of the kidney on either side discernible. Fig. 3 is a radiogram showing all these points. If such a radiogram as this be secured there is no reason that I can see why a positive or negative diagnosis may not be absolutely relied upon; but in a case where the radiogram is not up to this standard it is the duty of the observer to state this fact, so that the diagnosis, positive or negative, may be valued at its true worth.

"Let me impress upon you that in order to bring renal examinations to a successful conclusion it is essential that the examination should not be carried out in a hurried manner, for not only is it necessary to have the intestine properly emptied, but time should be allowed for re-examination, not once, but two or three times if necessary.

"It is often insisted on that the radiographer be in possession of all the clinical facts of the case before making his examination. Although a knowledge of the clinical history is desirable, it is, however, better, in my opinion, that at the time of examination the only knowledge one should have of the case is that it be one of supposed calculus in the kidney, bladder or ureter. By thus approaching the case the radiogram can be viewed with an entirely unbiased mind, and an examination in every case of the whole of the urinary tract becomes absolutely necessary. A provisional diagnosis having been made radiographically, the clinician can then compare his conclusion with that arrived at by the X-ray examination. Thus the value of clinical observation is considerably increased. Further, it is of the utmost importance that neither the clinical nor the X-ray evidence should be put in a place of first importance. It is wrong to state that X-ray evidence is infallible, and, on the other hand, it is surely equally wrong to advocate operation in the face of strong X-ray evidence to the contrary."

Dr. Bruce concluded by showing a number of lantern slides of radiograms of calculi in the urinary tract, a few of which are here reproduced (figs. 4, 5 and 6).

Clinical and other Notes.

SURGICAL TREATMENT OF FRACTURES.

By Major P. Evans, and Lieutenant J. Gilmour,
Royal Army Medical Corps.

During the last six months of the past year (1910), cases of fracture of the bones of the leg have been treated in the Military Hospital, Devonport, by the operative treatment recommended by Arbuthnot Lane.

Although the number of cases treated in this way is small, the results show that this method of treatment should receive more attention in military hospitals than it has up till now.

In our series of cases, the fractures occurred in the tibia and fibula. Five cases have been operated upon. Of these four were recent fractures and one was an old un-united fracture. Of the four recent fractures, three were compound and one simple. The latter and two of the compound fractures were comminuted.

The method of treatment adopted in each case was the same. A curved incision, about four inches long, was made with its centre over the site of fracture in the tibia. The incision extended down to bone in its entire length and a large flap was reflected. This gave adequate exposure of the fractured ends of the bone. The blood clots were then turned out and the exposed area wiped dry.

Reduction and accurate apposition of the fractured ends of the tibia was now attempted by means of extension and manipulation of the lower fragment by an assistant, with counter-extension at the same time applied to the head of the tibia, the fractured ends being guided by the surgeon.

In every case this was a matter of some difficulty, especially as in three of our cases there was a comminution of the ends of the bone. With the ends of the bone fully exposed it was always easy to get the fragments into so-called good position, but the object aimed at was perfect apposition. Our guides in attaining this were the anterior edge of the tibia and fitting the irregular outline of the one fragment into the irregular outline of the other.

After perfect apposition of the ends of the bone had been attained, a steel plate with four holes, for screw nails, was applied to the surface of the bone, so that its centre lay over the line of fracture. Holes were then bored in the tibia through the holes in the plate and the screw nails were inserted. The fractured ends were then secured in proper position, and the plate was firmly screwed to the surface of the bone. In every case the periosteum was raised from the surface of the bone, and the plate was inserted between the periosteum and the bone. The periosteum

was then replaced over the plate and the wound was sewn up. In all the cases the operation wound healed by first intention. In one case (No. 1) the fracture was compound, and the original wound was represented by a small puncture. This healed very slowly and subsequently gave trouble, as a small blister formed and burst. The plate was found immediately below this. In this case the plate was removed at a subsequent operation on the 80th day, to obviate the risk of sepsis spreading to the medullary cavity, by way of a screw.

With regard to the technique of the operations. The cases were prepared in the usual way. Perchloride of mercury compresses were applied to the limb on the night previous to operation. Immediately before commencing the operation, the skin round the site of injury was scrubbed with a nailbrush and soap, then ether and a solution of biniodide of mercury in spirit were applied. The skin was prepared with iodine in one case. The instruments were kept in trays filled with sterile water. No antiseptics were allowed into the wound. Sterile towels were carefully applied to the limb, so that after the first incision no patient's skin was visible. Rubber gloves were worn by the surgeon and his assistant, and their fingers were not allowed to enter the wound. Plates, screws, &c., were lifted by means of instruments. "Knife and fork" surgery was carried out, and no ligatures were applied to vessels. Bleeding was stopped by pressure forceps and torsion.

The results lead one to the conclusion that, where there is difficulty in getting the bones into good position owing to over-riding or comminution an open operation with plating gives satisfactory results. The X-ray photographs were taken by Private F. J. R. Baiden, R.A.M.C.

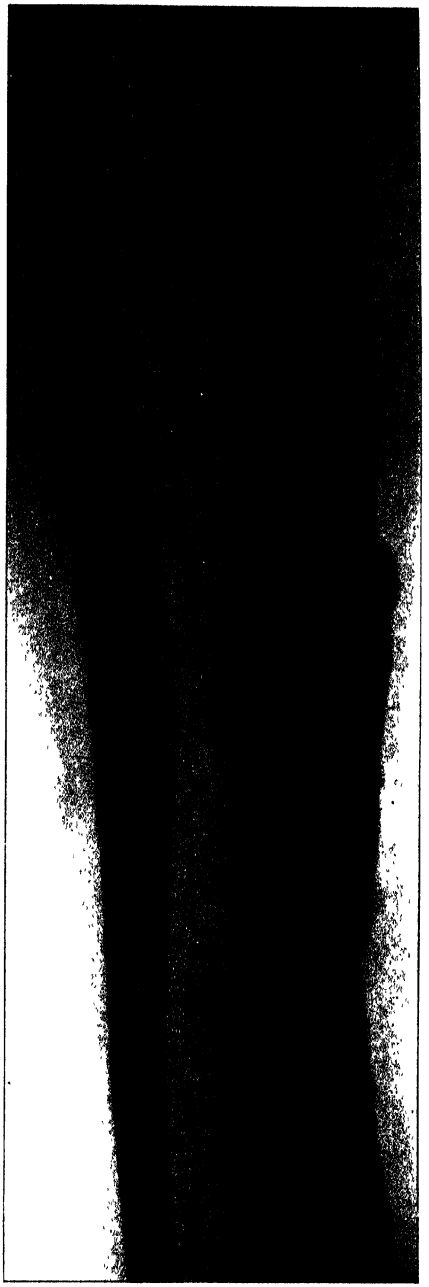
Case 1.—*Compound Fracture, Right Tibia and Fibula.*—Driver Y., age 23, Royal Field Artillery.

August 4th, 1910.—Patient was struck on the leg, at Okehampton, by a large boulder, and sustained a fracture of the right tibia and fibula, at the junction of the lower and middle thirds of the leg. There was a small punctured wound at the inner border of the shin over the seat of fracture, caused by a projecting sharp piece of bone.

August 8th. *Operation.*—The fractured ends were exposed. The displacement was reduced and a plate with four screws inserted. The limb was placed in a McIntyre's splint. August 15th.—Stitches were removed. Primary union. August 26th.—Massage commenced, leg remaining in the splint. September 14th.—Patient up on crutches, but was not allowed to put his weight on the limb. September 18th.—Patient commenced to walk with the aid of a stick. September 22nd.—Walking without his stick. September 28th.—Small blister appeared at the site of the wound caused by the projecting piece of bone. October 7th.—Bleb incised. October 17th.—X-ray negative showed the sinus was over



Case 3.—Before operation.



Case 3 - After operation.

To illustrate "Surgical Treatment of Fractures."

By Major P. Evans, R.A.M.C., and Lieutenant J. Gilmour, R.A.M.C.

a screw. October 27th.—Plate was removed, as the wound did not heal. The screws were found to be loose. November 7th.—Wound completely healed. November 24th.—Patient discharged hospital on six weeks furlough, walking well. January 18th, 1911.—Man returned from furlough yesterday, and was examined by the medical officer in charge of barracks, who says, " at present the result is good."

Case 2.—*Simple Comminuted Fracture, Right Tibia and Fibula.*—Gunner S., age 23, Royal Garrison Artillery.

September 15th, 1910.—Patient was admitted to hospital suffering from fracture of the right tibia and fibula in the middle third of the leg. The accident was caused at football, the same afternoon. The fracture was simple. Attempts were repeatedly made to get the limb into good position without success; it was therefore decided to insert a plate.

September 27th. *Operation.*—The fractured ends were exposed and great deformity was found. There was a loose wedge-shaped portion of bone lying between the ends of the bone, but by leverage and manipulation the fragments were got into good position and the plate applied on the antero-internal surface of the tibia. It was not necessary to remove the loose fragments. September 28th.—Limb placed on a Neville's splint. October 3rd.—Stitches removed; primary union. November 2nd.—Plaster splint applied, patient allowed up on crutches the following day. November 12th.—Allowed to walk on the injured leg with one inside Cline splint. November 22nd.—Patient walking well. November 30th.—Discharged to furlough, walking well. January 21st, 1911.—Returned from furlough yesterday, can walk over 4 miles without a limp.

Case 3.—*Compound Comminuted Fracture, Right Tibia and Fibula.*—Private E., age 19, Leinster Regiment.

December 14th, 1910.—Patient was admitted to hospital suffering from a compound comminuted fracture of the right tibia and fibula. The fracture was situated at the junction of the lower and middle thirds of the tibia. The accident was caused by the patient being thrown from a cart. There was much displacement, and an inch and a half of shortening of the limb. There was a small punctured wound on the inner side of the leg at the level of the lower end of the upper fragment.

December 16th.—*Operation.*—The ends of the tibia were exposed by a curved incision and the displacement was reduced. A plate with four screws was inserted. December 24th.—Stitches were removed. Primary union. The original punctured wound was not quite healed. January 4th, 1911.—The punctured wound healed. January 16th.—Massage commenced. Leg in excellent position.

Case 4.—*Compound Comminuted Fracture, Left Tibia and Fibula.*—Private B., aged 20, Royal Marine Light Infantry.

December 21st, 1910.—Patient was admitted to hospital suffering from a compound fracture in the middle third of the left tibia and fibula. The accident was received at football. When the patient was admitted

there was a portion of tibia ¾ inch long projecting through his stocking and covered with mud. The stocking was cut away and the projecting piece of bone was scraped free of mud and swabbed over with 1 in 20 carbolic acid and then reduced.

December 22nd.—*Operation.*—The ends of the bone were exposed by means of a semicircular incision. There was much displacement which was difficult to reduce owing to a loose wedge-shaped portion of bone between the ends. A steel plate with four screws was inserted. December 30th.—Stitches were removed. Primary union. The original wound was almost healed, only a small granulating one being present. January 5th, 1911.—Original wound healed. January 16th.—Massage commenced. January 21st.—Limb placed on a Neville's splint.

Case 5.—Un-united Fracture following a Simple Comminuted Fracture of Right Tibia and Fibula.—Gunner W., aged 22, Royal Garrison Artillery.

August 27th, 1909.—Whilst playing football at Falmouth patient was kicked; the result was a fracture of his right tibia and fibula at the junction of the middle and lower thirds. There was extensive swelling of the limb and much displacement and shortening. The fracture was easily set, but would not keep in place. September 5th.—Re-set under chloroform. September 9th.—Again re-set.

October 7th.—*Operation.*—As the position of the limb was unsatisfactory the ends of the tibia were exposed and wired, the loose fragment being removed. January 29th, 1910.—X-rays did not show any callus. March 4th.—Wire removed, as it was irritating the skin. Firm union had not taken place. August 16th.—Operation. As the tibia remained un-united it was exposed by a large curved incision. A wedge-shaped piece of bone of sufficient size to correct the malposition was removed from the ends, the callus was broken across, and the axis of the limb restored. A plate and four screws inserted. January 24th, 1911.—The union was slow, but is now firm. There is still shortening of the limb and some deformity, but the patient can walk without the aid of a stick and is being discharged to civil life.

SHORT SUMMARY OF THE WORK AT THE LOUISE MARGARET HOSPITAL, DURING THE YEAR 1910.

By Major S. F. GREEN,
Royal Army Medical Corps.

The strength of the women and children in the Aldershot Command, from among whom the patients are admitted, is at least 7,074, including both those "on" and those "off" the strength, *i.e.*, 2,854 women and 4,220 children. An ever-changing population.

(1) The number of maternity cases admitted was 474, *i.e.*, 310 multiparæ and 164 primiparæ.

Of these there were:—

465 vertex presentations 15 breech ,, 1 face ,, 2 transverse ,, 1 Cæsarean section	Total number of infants: 485, including the Cæsarean section case, 11 sets of twins, and 14 still births.

The above cases included: 17 persistent occipito-posterior presentations; 2 of prolapse of cord; 1 of placenta prævia; 1 in which forceps were applied (face case); 2 of adherent placenta; 2 in which version was performed; 10 premature births; 14 still births (including 6 premature and 6 macerated infants).

The following malformation cases occurred: 1 anencephalic infant: 1 cleft palate; 1 spina bifida; 1 double talipes.

Two deaths occurred among the maternity patients:—

(i.) The first of these cases arrived at the hospital when she was well advanced in labour (the baby being born three-quarters of an hour afterwards). Although she was suffering from fever at the time of her admission, and had come from a house in which a case of diphtheria had just occurred, it was too late to send her back, so she was put into a special one-bedded ward and isolated, a separate nurse being placed over her. She died of septicæmia twenty-four days after confinement.

(ii.) The second case was one of pregnancy complicated by a large multilocular ovarian cyst (containing 70 ounces of fluid), with a long twisted pedicle, causing complete intestinal obstruction and suppression of urine.

For fuller notes of this case, *see* remarks on the following list of operations.

(2) Number of cases admitted for general diseases: 541, *i.e.*, 222 women and 319 children.

(Total number of admissions during the year, including both maternity and general cases: 1,015).

(3) Number of women and children who attended as out-patients on Tuesdays for extraction of teeth (mostly under nitrous oxide gas): 270.

(4) Number of attendances of women (special gynæcological out-patients), on Thursdays: 439.

(5) The number of major and minor surgical operations performed during the year was 368, of which six died, namely: 3 cases of appendicitis, 1 case of cancer uterus, 1 large cyst of ovary, 1 case of osteomyelitis.

The following is a list of the operations:—

I. ABDOMINAL OPERATIONS.

Total: 66 (61 successful, 5 died).

A. Cases of Laparotomy.

(1) *Excision of the Vermiform Appendix (for Appendicitis):*
10 cases—7 successful, 3 died.

Of the three fatal cases, one died of broncho-pneumonia (? tubercular) the twelfth day after the operation. In this case, on opening the abdomen, a large quantity of unhealthy-looking serum escaped from the peritoneal cavity. The appendix was much thickened and inflamed.

The second case died of general peritonitis five days after operation.

The third of these cases was admitted into hospital in a very critical condition, and at the operation a large fœtid abscess was found, with a very gangrenous appendix and gangrenous bowel adjacent. Patient died ten hours after the operation, of acute septic poisoning.

Of the successful cases, one appendix contained threadworms, three contained fæcal concretions, one was in a very gangrenous condition, and connected with a foul abscess which burst into the general peritoneal cavity. This appendix was perforated and contained a hard concretion shaped like a date stone. The patient made an excellent recovery. In the other cases, the appendix was inflamed and ulcerated.

(2) *Cæsarean Section :* 1 case, successful.

This operation was performed *three days before full term.* True conjugate was 2½ inches. After removal of the child from the uterus, *supravaginal hysterectomy* was performed. Patient made an uninterrupted recovery, and left the hospital twenty-seven days after the operation. When last seen (eight months after the operation), both mother and child were in splendid health. Previously this woman had twice had to undergo induction of labour, and each time was much distressed at not having a living child.

(3) *Cholecystostomy :* 1 case, successful.

Seven large gall-stones (each about ¾ inch in diameter) were removed from the gall-bladder. Patient had had six attacks of severe colic in the previous nine months. She made an excellent and rapid recovery.

(4) *Exploratory Laparotomy :* 2 cases, both successful.

(*a*) *For Gastric Ulcer.*—This patient had been under treatment for gastric ulcer for about six months previous to admission to hospital. On the day before the operation, she vomited up 3 ounces of blood, and on the morning of the operation she vomited up 20 ounces of pure blood. As her condition was getting serious, an operation was performed at once. No sign of an ulcer, however, could be found, either in the stomach or duodenum, but the gastric vessels were much congested with blood. Patient made a good recovery, and when last seen (three months after the operation) although still very anæmic, she was much stronger, and had put on weight. At the time of the operation, patient was suffering from severe pyorrhœa alveolaris.

(*b*) *For Cysts of Broad Ligament.*—A simple thin-walled cyst. Burst.

(5) *Operations for the Removal of Fallopian Tubes, Ovaries, &c. :* 11 cases, 10 successful, 1 died.

Case A.—Removal of left tube and ovary and right tube, for double pyosalpinx. Left ovary contained several large cysts filled with brownish fluid.

Case B.—Removal of both Fallopian tubes and right ovary for double pyosalpinx. Extensive adhesions.

Case C.—Removal of right ovary and portion of adherent omentum for cysts of ovary.

Case D.—Removal of both tubes and ovaries for double pyosalpinx. Both ovaries matted together with Fallopian tubes, right ovary in a condition of cystic degeneration. Extensive adhesions.

Case E.—Left tube and ovary removed for cyst about the size of large walnut in the left ovary.

Case F.—Removal of both ovaries for cystic degeneration.

Case G.—Removal of left tube and ovary, for multilocular cyst of left ovary, containing 27½ ozs. of fluid.

Case H.—Removal of left tube and ovary, for multilocular cyst of left ovary. Upper limit of cyst reached to midway between the symphysis pubis and umbilicus.

Case I.—Removal of left tube and ovary for simple cyst of left ovary, 3 inches in diameter.

Case J.—Removal of left tube and ovary for simple cyst of left ovary, 2½ inches in diameter.

Case K.—Removal of right tube and ovary. This case, which died, was admitted into hospital on April 24th, in great pain and distress. The same afternoon she was delivered of a 6½ months still-born child. On April 25th, her abdomen became much distended, and a large cystic tumour was found occupying the left flank, which was very tender on the surface. Later she developed (during the night) symptoms of complete *intestinal obstruction and suppression of urine*, and laparotomy was performed on April 26th. The cyst in the left flank was found to be a cyst of the right ovary, the pedicle of which was twisted and stretched right across the abdomen, causing obstruction to the intestines and ureters. This cyst contained 70 ounces of straw-coloured fluid. Considering all she had gone through, the patient's condition remained quite satisfactory for about six hours; then she suddenly collapsed and died in about fifteen minutes of cardiac failure. At first it was thought that she died from internal hæmorrhage, but on *post-mortem* examination there was no sign of bleeding, and the pedicle looked quite healthy.

(6) *Abdominal Hysterectomy.*

(*a*) *Total Hysterectomy.*—2 cases: 1 successful, 1 died.

(i) Carcinoma of vaginal portion of cervix. This patient made an excellent and rapid recovery, and a few weeks afterwards she was seen riding a bicycle.

(ii) Carcinoma of supravaginal portion of cervix. This patient died, nine hours after the operation, of cardiac failure. At the operation the

disease was found to be much more extensive than it was at first thought to be.

(*b*) *Supravaginal Hysterectomy.*—9 cases: all successful.

(i) Large submucous fibromyoma. Weight of fibroid with the body of the uterus was 6 lb. 10 oz. This case was operated on by Captain Ryan, R.A.M.C.

(ii) Large submucous myoma. The tumour in this case appeared, to the naked eye, to be a pure myoma on section. It was about the size of a cricket ball.

(iii) Large submucous fibromyoma. This fibroid tumour with the body of the uterus weighed 3½ lb. (a fibromyoma). The fundus of the uterus reached as high as the umbilicus.

(iv) Large interstitial fibroid occupying posterior wall of the uterus. In this case there was also a cystic condition of the right ovary, which was removed at the same time.

(v) Cysts of both ovaries. In this case there were abundant adhesions, and the body of the uterus was found to be much inflamed. As both ovaries had to be removed, it was considered inadvisable to leave a useless uterus that might otherwise ultimately become the seat of malignant disease, so the body of the uterus was removed.

(vi) Cysts of both ovaries. In this case, too, the body of the uterus was also removed, for the same reason as given in (v).

(vii) Cystic disease of right ovary. Left ovary had been removed for a similar condition some time previously. The body of the uterus was also removed as well in this case for the same reason as given in (v).

(viii) Double pyosalpinx. In this case, both tubes and right ovary, as well as the body of the uterus, were removed.

(ix) Multilocular cyst of left ovary with right pyosalpinx. This was an exceedingly interesting case. The cyst extended well above the umbilicus. It took two hours and a half to separate the adhesions of intestine and omentum, and about six inches of the great omentum had to be cut away. In addition to this large cyst of the left ovary, there was a pyosalpinx on the right side. It was impossible to separate the cyst from the posterior wall of the uterus, so that supravaginal hysterectomy had to be performed. Patient made a rapid recovery, was up on a sofa seventeen days after the operation, and left the hospital at the end of the fourth week.

(*Note.*—In addition to these, one hysterectomy (supravaginal) has been shown above under Cæsarean section, and another below under ectopic gestation complicated by fibroid.)

(7) *Operations for Ectopic Gestations.*—5 cases: all successful.

Case 1.—Ruptured tubal pregnancy (left side). Left tube and ovary removed with sac. Rupture occurred on the posterior surface of left tube. Large amount of blood and clots in Douglas' pouch.

Case 2.—Ruptured tubal pregnancy (left side). In this case a large amount of clotted blood was found contained in a sac formed by adhesions, and extending nearly up to the umbilicus. There was also a large interstitial fibroid of the uterus, pressing up on the left fallopian tube, and thus, no doubt, causing the ectopic gestation. Supravaginal hysterectomy was performed and the left tube and ovary removed. This case was operated on by Captain Ryan, R.A.M.C.

Case 3.—Ruptured tubal pregnancy (right side). Right tube and ovary removed with sac. Immediately on opening the abdomen a large quantity of blood and clots escaped.

Case 4.—Ruptured tubal pregnancy (left side). Left tube and ovary removed with sac.

Case 5.—Ruptured tubal pregnancy (left side). In this case patient (aged 32), married 7 years, no children, and no miscarriages (always regular), had gone three weeks over time. No vaginal hæmorrhage at all. Seized with severe abdominal pain five days before admission. Was operated on one hour and a half after admission. Fully three and a half pints of blood in abdominal cavity.

(8) *Radical Cure of Umbilical Hernia.*—2 cases: both successful.

One of these cases (an infant aged 3½ months) was brought to the hospital suffering not only from a large umbilical hernia (in which the intestine was adherent to the sac), but also from a double inguinal hernia and phimosis.

An operation was performed for each of these conditions. The child made an excellent recovery, and is now (several months after the operations) thriving well, whereas before the operations it was considerably wasted and continually crying.

The other case was an infant aged 6 months.

B. Other Abdominal Operations.

Number of Cases.—20 radical cure of hernia: all successful; 1 radical cure of congenital hydrocele: successful; 1 pelvic abscess opened and drained: successful; 1 nephrorrhaphy: successful.

II. MISCELLANEOUS OPERATIONS:—

Total 302 (of which 1 died).

Number of Cases.—86 circumcision; 1 operation for epispadias; 5 removal of cysts; 6 excision of nævi; 2 excision of varicose veins of leg; 2 ligature and excision of internal piles; 1 operation for osteomyelitis (this case died); 3 operations for fistulæ; 5 operations for removal of foreign bodies from the tissues; 1 excision of the breast and glands in axilla for carcinoma; 2 operations for tubercular joints; 1 enucleation of the eyeball (for sarcoma of the choroid); 1 incision of the cornea (for removal of slough from corneal ulcer); 12 erasion of glands; 1 large

pyæmic abscess of shoulder joint, opened and drained; 13 abscess of connective tissue, opened and drained; 1 mastoid abscess, opened and drained; 5 abscess of breast, opened and drained; 1 operation for malunited fracture; 1 operation for fibrous ankylosis; 32 removal of adenoids; 34 removal of adenoids and tonsils; 1 removal of adenoids and uvula; 42 removal of tonsils; 3 dilatation of cervix uteri (for spasmodic dysmenorrhœa); 3 perineorrhaphy (for old ruptured perineum); 33 curetting of uterus (for subinvolution, endometritis, polypi and retained placental products); 3 induction of premature labour (for contracted pelvis); 1 excision of portion of cervix uteri for examination.

A REPORT ON THREE CASES OF SYPHILIS TREATED WITH SALVARSAN.

By Captain E. G. FFRENCH.
Royal Army Medical Corps.

Before leaving London for India, I was fortunate in seeing several cases of syphilis treated with Ehrlich's "606," at the London Lock Hospital, and the West London Hospital. Owing to the kindness of Mr. McDonagh, I have been able to try the specific in some specially selected cases in India. The technique employed was that of Wechselmann.

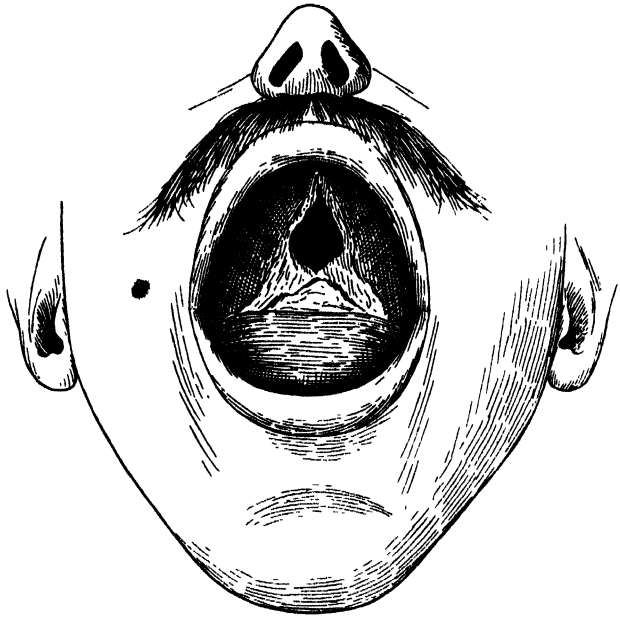
Case 1.—Colour-Sergeant G. R., Dublin Fusiliers, aged 35, service seventeen years, was admitted to hospital on November 12th, 1910, suffering from a large perforation of the soft palate and sloughing ulceration of fauces and posterior wall of pharynx. The uvula had sloughed away. He had the nasal voice of patients suffering from perforation of the palate. He stated that his present condition started about three weeks before his admission, and had run a rapid course.

His medical history sheet showed that he had a soft sore in Pietermaritzburg, Natal, ten years ago; shortly afterwards he was admitted for secondary syphilis and underwent seventy-two days treatment with hyd. c. cret. He did not have any more admissions for syphilis and never had any further treatment, but kept pretty fit in the meantime. On admission his weight was 10 st. 10 lb., his urine normal and other organs healthy. His eyesight was tested and found to be very good.

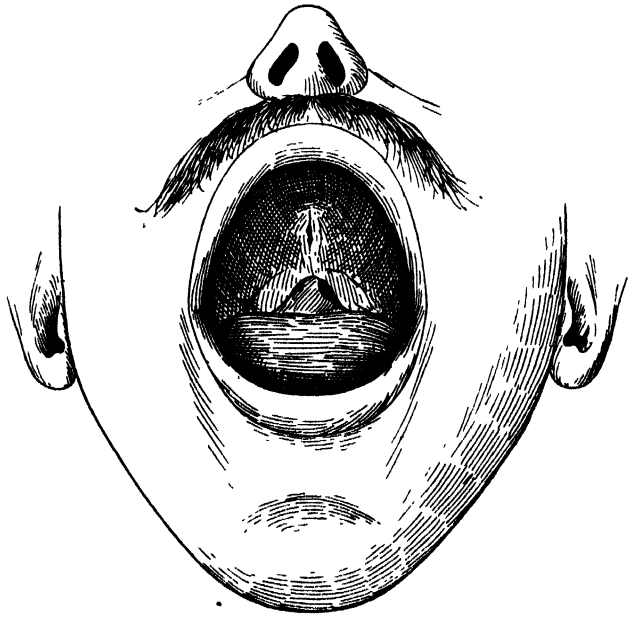
On admission pot. iod. and hydrarg. perchlor. were given for the first week, but his condition became worse instead of improving. At the end of that time 0·5 gramme of salvarsan was injected into the muscles of the right scapula.

The patient did not suffer any actual pain afterwards, but complained of a little soreness at the site of injection on moving from side to side. The temperature never rose above normal and he stated that beyond the soreness, which passed off in about five days, he felt all right.

On the second day there was marked improvement in the appearance



BEFORE INJECTION.
Large perforation of palate, sloughing ulceration of fauces and posterior wall of pharynx.



THREE WEEKS AFTER INJECTION.
Palate healed, folds on fauces forming.

of the perforation and other parts. On the fourth day, the sloughing had ceased entirely and all the parts had commenced to heal rapidly.

At the end of the first week the perforation was about one-third its original size and all the ulceration of fauces and pharynx had healed nicely.

The patient was weighed and found to have gained 5 lb.

His condition steadily improved and at the end of four weeks the perforation had closed completely and he had regained his normal voice. About four or five days after the injection, a small amount of lymphoid tissue was noticed at the site of the uvula; this has now grown into a fairly large process, new folds on the fauces have also formed. His weight was taken and showed an increase of 18 lb. He had also well-marked leucoplakia on the tongue which cleared up in five days. He states that he feels wonderfully well, and I consider that he has made a marvellous recovery.

Case 2.—Lance-Corporal R., 1st Lincolnshire Regiment, aged 32. This case was specially transferred from Poona. He acquired syphilis at Secunderabad in January, 1905, but did not get any mercury as it was considered to be a soft sore. At the end of May of this year his throat and gums became ulcerated, and he was placed on the Syphilis Register, June 1st, 1910. Since then he has had ten courses of mercurial inunction periodically, but his condition has not improved.

Condition on Admission:—Deep ulceration of both tonsils, widespread ulceration of posterior pharynx, deep sloughing ulceration at the front and back of the gums of the upper jaw, all the remaining upper teeth are loose. He had already lost five of his upper teeth on the right side owing to ulceration of the gums. The odour from his breath was most offensive. There was evidence of disease of the upper part of the left nasal bone with a foul-smelling discharge. He was also suffering from severe tibial pains at night and his general appearance was emaciated.

He was examined and found fit for injection. On December 6th, 0·5 gramme salvarsan was injected into the muscles of right scapula. He suffered no pain after the injection, but was somewhat restless that night, owing to tibial pains; $\frac{1}{8}$ grain morphia was given. The temperature rose to 99·8°. On the second evening the temperature was 101°, but became normal after three days. He also suffered from a little soreness at the site of the injection, but nothing else. The day following the injection there was improvement in the condition of his mouth. On the second night the patient slept well, as the tibial pains had completely disappeared.

At the end of the first week the tonsils, pharynx and gums had completely healed, and the teeth were now quite firm. The discharge from the left nostril had diminished considerably.

On the eighth day a small piece of necrosed bone came away from his left nostril. He was weighed and found to have gained 2 lb.

A fortnight afterwards the gums and throat had completely healed, and the patient stated that he felt like a new man.

On the 23rd a large piece of necrosed bone came away from the left nostril. On the 25th the discharge from the nose ceased. On the 29th he was weighed and found to have gained 1 st. 2 lb. He now looks quite well and is free from all symptoms.

Case 3.—Private L., 1st Lincolnshire Regiment, aged 30. This patient was also transferred from Poona for Ehrlich's specific treatment. Both cases arrived on the same day, and were injected within half an hour of one another, as I thought it would be interesting to compare the after-effects.

This patient acquired syphilis in October, 1910, and was placed on the Syphilis Register, November 18th, 1910. During his stay in hospital at Poona he was given three courses of ung. hydrarg. 40 grains daily.

On admission to this hospital he was covered with a papular rash—face, trunk, and upper and lower limbs. He was also suffering from severe ulceration of the tonsils, and well-marked enlargement of the cervical and inguinal glands. He looked very ill and weighed 8 st. 13½ lb., his normal weight being a stone heavier. He was examined and found fit for "606"; 0·5 gramme of salvarsan was injected into the muscles of the right scapula. He suffered from some pain (not severe) in the muscles for two hours afterwards. That night he was given ⅙ grain morphia as he was restless and could not sleep. Temperature 99°.

On the following day the rash on his face had already commenced to disappear, and the cervical and inguinal glands were less swollen. On the second day after the injection the enlargement of the glands had completely disappeared, the rash on the face was much less obvious, while on the trunk and limbs it had commenced to disappear. He slept well at night. On the third day there was some infiltration at the site of injection.

For three days there was an evening rise of temperature, but after this the temperature was slightly subnormal. The infiltration travelled lower down his back every day, and at the end of the sixth day it settled at the lower lumbar region. It, however, completely disappeared at the end of the ninth day. At the end of the fifth day the rash had disappeared from his face without leaving the slightest trace.

On the sixth day he had gained 1½ lb. A fortnight afterwards his condition was as follows: On his face there is no trace of rash, and it has almost completely disappeared from the trunk and limbs, only a few stains remaining. The condition of his throat is quite satisfactory. He has gained 6 lb. in weight. He looks quite well and says he feels so. With the exception of a few skin stains on his legs, there is nothing to show that the man has ever had syphilis.

I have again to thank Mr. McDonagh for his kindness in giving me a few tubes of "606," and also Captain H. L. Howell, R.A.M.C., for the

excellent drawings he made of the case of perforation of palate. The three cases described are among the first patients treated with salvarsan in India.

A CASE OF RETRO-PERITONEAL SUPPURATION.

By Lieutenant G. H. DIVE.
Royal Army Medical Corps.

The patient, aged 23, was admitted to the Queen Alexandra Military Hospital, September 21st, 1910, suffering from fever of unknown origin. Temperature 101·8, pulse 122, respirations 24.

History.—For seven days the patient has had pain in the right side of the chest on full inspiration, and profuse night sweats. During the last month he has been losing weight, but has not had any cough, hæmoptysis or pleurisy. He has also suffered from epigastric pain for about two months; this pain usually came on about one hour after food, and was sometimes followed by vomiting which gave relief. He has also had occasional diffuse pain on the right side of abdomen, but no hæmatemesis or melæna.

The condition on admission was as follows: Tongue, covered with brown fur; heart, apex beat displaced 1 inch outwards to the left, no murmurs heard; lungs, some impaired air entry on the right side; abdomen, no "spots," no splenic enlargement, no abdominal tenderness. There was marked tenderness and hyperæsthesia in the lower three right intercostal spaces behind, extending in the right lumbar region down to the iliac crest and as far forward as the mid-Poupart plane. The pain was not referred to any other region or increased by deep respiration.

Urine.—No abnormal constituents. No jaundice. *Blood:* Widal reaction for *Bacillus typhosus* proved negative, leucocytes 18,800 per cmm.; culture negative.

The pain together with fever of a septic type continued, but no localising signs were found until September 27th, 1910, when pleural friction, with diminished air entry low down, was found on the right side.

Exploratory punctures were made in the right pleura and the right loin with negative results.

The possibility of interlobar empyema was raised at this juncture, particularly in view of the existence of patchy areas of dulness in the right axilla. Accordingly exploratory punctures were made along the septal line, again with negative results.

Examination under X-rays showed that the movements of both sides of the chest were full and equal. No abnormally dense areas were found in the thorax. The dome of the liver, and the movement of the diaphragm appeared to be natural. The heart was not displaced, though considerably enlarged.

October 6th, 1910.—A diffuse macular rash developed. The pain, fever and leucocytosis continuing, an exploratory operation was decided on.

In the absence of localising signs and with such evidence as was available a diagnosis of retro-peritoneal suppuration seemed the most feasible.

Operation October 8th, 1910, by Major Pilcher. An aspirating needle entered perpendicularly in the tenth right intercostal space in the mid-axillary line encountered pus at a depth of 3½ inches.

Three inches of the tenth right rib were resected, the parietal and phrenic pleura sewn to the diaphragm and this incised. The needle was followed through the liver and 12 ounces of pus evacuated from a cavity of no recognisable anatomical boundaries but extending inwards to the middle line and downwards to the right. The pus provided a pure culture of *Staphylococcus pyogenes aureus*.

Temporary improvement followed, but persistence of fever and leucocytosis indicated further surgical interference.

November 11th, 1910.—A counter incision was made in the right loin to meet a probe passed into the sac from above.

The upper wound healed rapidly, but despite several operations a sinus still persists in the loin.

As to the origin of the condition it seems probable that a duodenal ulcer had leaked through and infected the retro-peritoneal tissues of that region.

The pain and hyperæsthesia would then be explicable by the anatomical distribution of the lumbar nerves.

I am indebted to Lieutenant-Colonel Maher, R.A.M.C., for permission to publish the notes of this case.

A CASE OF BILATERAL PERIPHERAL FACIAL PALSY.

By Lieutenant G. H. DIVE.
Royal Army Medical Corps.

The following brief account illustrates this rare condition.

The patient, aged 23, was admitted to the Queen Alexandra Military Hospital on August 18th, 1910, with right-sided facial palsy of fourteen days' duration. This was peripheral in type, and probably consequent on exposure. Seven weeks after the onset, and whilst still undergoing treatment, facial palsy of the left side appeared; this was also peripheral in type. Both palsies were severe, and the reaction of degeneration was obtained on both sides. There was no evidence of central disease.

Treatment consisted of rest and sedatives, followed by galvanism, faradism and massage.

As regards the final condition the right side recovered first and completely (November 9th, 1910), and the left side almost so.

I am indebted to Lieutenant-Colonel Maher, R.A.M.C., for permission to publish this case.

FEVER OF MALARIAL ORIGIN.

By Captain R. G. H. TATE.
Royal Army Medical Corps.

Working in a laboratory in India during the fever season of the year, one cannot help being struck by the number of blood-films sent in which fail to show the parasites of malaria, even after repeated and careful examination. Many films are sent in simply as a routine matter, to eliminate the possibility of malaria being overlooked, but, setting these aside, there are many from cases in which malaria is genuinely suspected but in which no parasites are to be found. Among these are many possessing the characters which, according to Daniels, Da Costa, Manson, and Christophers, are typical of malarial blood, viz., a normal, or nearly normal, leucocyte count, a relative increase of the large mononuclear elements and pigment granules in the polymorphonuclear cells. On looking back through the medical history sheets of such cases one often finds a history of malaria, sometimes of recent date, but generally within the last year. As a rule the course of an attack of fever in such cases is short, lasting from one to four or five days, and not showing any periodicity; the case is, in most instances, returned as one of pyrexia of uncertain origin, whereas the fever is really due to old malaria. Again, if one takes films of blood from any hundred men who have had malaria at one time or another, it is surprising how many will show, in a greater or less degree, the changes noted above, and yet how very few show symptoms of active malaria. When dealing with native troops, time after time men come up complaining of "bukhar" (fever), in whose blood no parasites can be found, but whose blood shows the same relative increase of mononuclear elements as is seen in Europeans. The lack of true malarial symptoms in many of these native cases may be due to the immunity acquired in infancy and described by Koch. Now there must be some determining factor which will light up an attack of fever in these cases, although such an attack may have none of the characteristics of malaria, and two years work in the inspection room of a battalion which had suffered heavily in a malarious district, has pointed very clearly to there being at least four such agents: Over-exercise, chill, sun and digestive disturbance. Enquiry has nearly always brought one or other of these causes to light in natives and Europeans, and it would also point to the fact that sun alone, without over-exercise, may produce an attack of fever in such cases, although no other symptoms of in-

solation are present. In such cases in the battalion mentioned, quinine has rarely had any effect, curative or prophylactic; the drugs which proved most effective being iron and arsenic, the former being always administered in one of the "scale" preparations, as being less likely to produce digestive disturbance in patients who were probably already more or less upset by much quinine. These drugs, used together, certainly have a most beneficial curative and prophylactic effect in the cases under consideration. There is nothing in the above short note which is not already well known to all those who have served in malarious countries; its object is to suggest the prophylactic administration of iron and arsenic, as by this means, perhaps, we may be enabled to eventually reduce the number of cases which we are at present compelled to relegate to the "limbo" of pyrexia of uncertain origin, for want of a better and more scientific name.

Echoes from the Past.

THE FIRST BEARER COMPANY.

REPORT ON THE ORGANISATION AND WORKING OF THE BEARER COMPANY OF THE TRANSVAAL FIELD FORCE, DURING THE SEKUKUNI CAMPAIGN OF 1879, BY SURGEON MAJOR JAMES HECTOR,[1] ARMY MEDICAL DEPARTMENT, COMMANDING THE COMPANY.

ABOUT the 22nd of October, 1879, I was asked by Colonel Brackenbury,[2] Chief of General Sir Garnet Wolseley's Staff, if, in a short space of time, I would be able, if given a number of men from regiments, to train them to act as stretcher bearers in the forthcoming Sekukuni campaign. I said I could, in the course of a fortnight or so, train them sufficiently to enable them to discharge the duties of Nos. 1, 2, and 3, bearers, of a Bearer Detachment, but that it would take much longer to train them as No. 4 bearers, that is, to be able to apply first dressings on the field.

On November 1st, while the force was halted in camp at Paquani (near Fort Weeber), two non-commissioned officers, and twenty-four men from the 2nd Battalion, 21st Foot, and an equal number from the 94th Foot, were handed over to me to be trained as stretcher

[1] Afterwards Lieutenant-Colonel, an obituary notice of whom appears in this month's *Corps News*.

[2] Now, General Right Hon. Sir Henry Brackenbury, G.C.B., K.C.S.I.

bearers, and at the same time about sixty-five Kaffirs (Morensky's men) to be instructed in the same way. I at once set about putting these men through the regular course of instruction in stretcher exercises, which is carried out at the Depôt of the Army Hospital Corps, at Aldershot, and also refreshing the memories of the men of the Army Hospital Corps, who from time to time, joined from down country, not only in the stretcher exercise, but also in the application of first dressings, tourniquets, splints, &c. The Regimental men, as also the men of the Army Hospital Corps, took to the new work willingly, but great difficulties were experienced in teaching the natives, as none of them understood a word of English, nor knew his right hand from his left. On 3rd November, Surgeon O. E. P. Lloyd,[1] A.M.D., joined the Force, and was attached to the Bearer Company. This was fortunate for me, as having no reliable non-commissioned officer capable of instructing, I had been obliged previously to do everything myself. Surgeon Lloyd having a good knowledge of ordinary Company drill, and by dint of working hard to acquire a knowledge of stretcher exercise, soon began to render me valuable assistance in the instruction of the men.

The instruction was continued with great industry by Surgeon Lloyd and myself until 14th November, when I was so satisfied with the progress both Europeans and natives had made, that I considered them fit for inspection. I so reported to the Senior Medical Officer[2] of the Force, and said that I thought it would have a good effect on the men if he ordered an inspection at an early date, and if possible got His Excellency General Sir Garnet Wolseley to be present. This he at once arranged, and the inspection came off the next day, 15th November. The men were drawn up in column at open order at 3.45 p.m. on a piece of ground suitable for the work to be done, opposite the hospital camp, and punctually at 4 p.m. Sir Garnet Wolseley and his Staff arrived on the ground. Having received orders through the Senior Medical Officer from the General to do so, I immediately proceeded with the stretcher exercise.

I had twelve stretchers manned by Europeans (the No. 4 bearer of each detachment being an Army Hospital Corps man) and fourteen by natives. We had three ambulances, in which I allowed only six men to be carried to the dressing station.

[1] Now Surgeon-General, V.C., C.B.

[2] Surgeon Major Benjamin Cowan Kerr, afterwards Brigade Surgeon; died when on retired pay, 3rd January, 1898.

Eighteen men of the European portion of the Company were ordered to lie down as wounded at a distance of 800 yards from the dressing station, each man being supplied with a ticket mentioning the nature of his supposed injury. The majority of injuries were of a nature to require the application of tourniquets, splints, &c., those in fact requiring the maximum of dressing which could be applied on the field. The men got out their stretchers, prepared them, and advanced with them the 800 yards to where the wounded were, dressed their wounds, and put them on the stretchers in the proper way, and with the exception of those accommodated in the ambulances, carried them back to the dressing station. Here they were taken out of the ambulances or stretchers as carefully as if they were really wounded, and the dressings which had been applied in each case were carefully inspected by me. The whole time occupied by these proceedings from the time the men filed on, and got their stretchers out of the wagons in which they were brought on to the field, until the time I had completed the inspection of the dressings at the dressing station was little more than three quarters of an hour, although everything was done slowly and deliberately so that the onlookers might see distinctly every detail of the work. I may mention that I did not discover a single mistake in the dressings of any of the eighteen cases, all of which were applied by the No. 4 bearers of each detachment, on the information given by the diagnosis ticket, and without any further advice or assistance.

Sir Garnet Wolseley and the members of his Staff afterwards expressed themselves to me as exceedingly pleased with what they had seen, and their pleasure at finding that the men had made such good progress in the short time they had been under instruction.[1]

This may be said to have been the last instruction parade I held, as on the morning of 20th November we commenced the advance on Sekukuni's Town. On the 23rd the whole of the Western Force, to which we belonged, concentrated at Fort Albert Edward, and on the 24th, a portion of it, which included the Bearer Company, advanced to a post established about 7 miles further on. The same afternoon a considerable portion of this Force was pushed on, marching all night, to seize the Water Koppie at Sekukuni's Town, and with this party I went, taking with me Surgeon Lloyd and half the Bearer Company, Europeans and natives, and leaving the remainder behind with the rest of the Force in case they might require any assistance.

[1] See Chief of Staff's *Journal of the Military Operations in the Transvaal*, 1879, p. 29.

The Water Koppie was seized at daylight on the 25th without any opposition from the enemy, and on the 25th and 26th we remained quietly and undisturbed at that place. On the 27th Sir Garnet Wolseley arrived, went out reconnoitring, and ordered our camp to be moved about 2 miles further up the valley and just opposite Sekukuni's Town. The remainder of the column arrived during that day, and all arrangements were made for the attack to be made at daylight the next morning.

A question I had early to decide was how I could to the best advantage distribute the stretcher bearers at my disposal, these being too few for the extent of ground covered by the fighting.

The attack was to consist of four parts: (1) That by the eastern portion of the Force, on the Lydenburg side. It was to come up the east side of the hill, over its top, and down the western side upon the town which lay at the foot. With this attack we had nothing to do. (2) The Right attack, to be made by Ferreira's Horse, consisting of about 120 Europeans, supported by natives, on the side of the mountain on our right of the town. (3) The Left attack to be made by the mounted volunteers with about thirty-four Mounted Infantry belonging to the 94th Regiment, on the side of the mountain on our left of the town; and (4) the Centre attack to be made upon "The Fighting Koppie," an isolated hill in front of the town, naturally very strong and much strengthened by art, and which was really the citadel of the town. The Force composing the Central attack consisted of Royal Artillery, the 2nd Battalion, 21st Foot, and 94th Foot.

As both the Right and Left attack were on the sides of an exceedingly rough mountain, where the greatest difficulty would have been experienced in working stretchers, and as the regular European troops were almost entirely concentrated round the fighting koppie—and it was there that the most obstinate resistance and hardest fighting were expected—I made up my mind that the best thing I could do was to keep all my stretchers for duty with the central attack.

Being unable to supply a competent dresser to the stretchers manned by natives, I considered that it would be useless to send them to the front to work independently, and besides, I doubted the possibility of getting them to come up properly and remain under fire. So I thought the best way I could utilise them was that they should relieve the European bearers of the greater part of the work of carrying the loaded stretchers to the rear, and also keep up the supply of empty stretchers in the front.

Thus all the dressing of wounded and loading of stretchers would be done by the European bearers, who would carry the loaded stretchers only about 150 yards to the rear, where they handed them over to the native bearers, who gave empty stretchers (to be brought back to the front) in exchange for them, and took the loaded ones to the ambulances or the dressing station.

I detailed one lance-corporal and three of the Regimental privates, and two privates of the Army Hospital Corps for duty at the dressing station, where also other men of the Army Hospital Corps, drawn from the Field Hospital, were posted. This left me fourteen European stretcher detachments for duty on the field, each of which had an Army Hospital Corps man as a No. 4 bearer or dresser.

The stretcher bearers paraded at 3 a.m. on the 28th, in marching order, but without rifles or ammunition, in two companies, one formed of Europeans and one of the Natives.

The following is a copy of the parade state :—

Corps	Surgeon Major	Surgeon	Sergeants	Corporals	Second Corporals	Lance-Corporals	Privates	Kaffirs	Total	Remarks
Army Medical Dept. ..	1	1	..	..	..	..	..	..	2	..
2nd Batt. 21st Foot ..	..	..	..	1	..	1	21	..	23	Three men in hospital on day of the action
94th Foot	..	..	..	1	..	1	24	..	26	..
Army Hospital Corps..	..	..	1	..	1	1	15	..	18	.
Natives	..	..	..	..	..	..	..	56	56	..
Total	1	1	1	2	1	3	60	56	125	..

The dressing station was pitched, and the ambulance wagons drawn up close in rear of the position taken up by the Artillery, about 600 yards from the front of the koppie. The dressing station was worked by Surgeon Major W. Johnston,[1] and Surgeon James Fraser,[2] who kindly lent their services from the Field Hospital, and by them right good work was done during the day. Nine ambulances came up with us to the dressing station, and these did good service during the day in carrying wounded from the field to the dressing station, and thence to the Field Hospital pitched at the camp we left in the morning. Along with the ambulance wagons a surgery wagon started from the camp for

[1] Now Colonel, C.B., M.D., retired, Army Medical Staff.

[2] Colonel, Royal Army Medical Corps, October 3rd, 1898 ; died 9th May, 1899.

the field. This is a conveyance, by the way, which seems somewhat top-heavy for the roads in this country, and at any rate it had several times upset during its progress up country. It was very dark when we started and early in our advance we had to cross a river, the drift (or ford) of which was very bad. In trying to get it over this drift the surgery wagon unfortunately turned over and could not be righted again. However, Surgeon Major Johnston promptly had the most useful part of its contents transferred to an ordinary wagon, which succeeded in negotiating the drift safely, and so, thanks to him, the dressing station was not deprived of the important appliances, dressings, &c., which the surgery wagon contained. The first gun was fired about 4.15 a.m., and a few minutes afterwards the Bearer Company arrived on the ground, having marched from the Camp, the No. 3 bearers carrying the stretchers at the slope over their shoulders, the No. 2 bearers each a large tin water bottle filled, and the No. 4 bearers each an Army Hospital Corps haversack, containing the following articles:— 3 triangular bandages, 3 field tourniquets, 8 ounces lint, a pair of scissors, a knife, a spatula, a paper of pins, and two pairs of field splints, one for the upper and one for the lower extremities. Two of the Regimental non-commissioned officers each carried an ordinary haversack, containing spare triangular bandages and field tourniquets.

On reaching the spot occupied by the guns, I halted and extended the Company, and prepared stretchers, and then divided the Company into a right and left half Company. I took command of the former myself, posting it with the 94th Regiment which attacked the right side of the koppie and also kept in check a number of the enemy who were posted on the side of a mountain facing it, while I gave the command of the latter to Surgeon Lloyd, who took it to the assistance of the 21st regiment who attacked the left side of the koppie. Each half Company of European Bearers was supported by an equal number of the Native ones. The orders I gave (and they were strictly carried out the whole day) were that the bearers were to keep close up in rear of the line of skirmishers, advancing and retiring just as they did, and when their services were not required, they were to lie down close behind the skirmishers. While advancing or retiring, they were allowed to take advantage of any cover; but directly a man was hit, a medical officer and stretcher detachment got up, and went instantly to his assistance. The medical officer examined the wound, and diagnosed its nature and then the No. 4 bearer pro-

ceeded to apply the necessary first dressing, the medical officer filling up a diagnosis ticket (a counterfoil of which he kept) which he fastened to a button on the man's tunic, and it went with him to the dressing station, for the information of the medical officers there. The man was then properly lifted into the stretcher, and the loaded stretcher taken by the European bearers about 150 or 200 yards to the rear, and then handed over, as described above, to the Natives. The European bearers then returned to the front with empty stretchers which they got from the Native bearers, who, after they deposited their wounded at the dressing station, or ambulance, brought back the empty stretchers. In this way every man who was wounded in the central attack was immediately attended to, his wound was dressed, and he was at once carried to the dressing station, without any of his comrades being taken away from their duties in the fighting line. So things went on till about 9 a.m., by which time the skirmishers had advanced to within 150 yards at the foot of the koppie, when two of the guns were moved round, and commenced firing on the left side of the koppie. About 9.30 a.m., it was decided to assault the koppie on both sides. The left being the one where the principal attack was to be made, and the most fighting expected, I went there myself, and there concentrated nine of the stretchers, manned by Europeans. The storming party formed up behind the line of skirmishers, who, to cover their advance, kept up a heavy fire till they had passed them. The stretcher-bearers during this time were lying down behind the skirmishers, but directly the storming party had advanced about 15 yards in front of the skirmishers, I ordered them to get up, and led by Surgeon Lloyd and myself, they followed up close behind the storming-party until they reached the foot of the koppie. Astonishing to say, no casualties occurred amongst the stormers here. On the koppie itself, there were several casualties, which of course the stretcher-bearers had to stop to attend to, a matter which was rendered very difficult by the rough rocks and boulders of which the koppie was composed, and the men were much exposed to danger from the shots which were being constantly fired by the enemy from the numerous openings in the caves, of which the koppie was one mass.

By 10 a.m. our men were on the top of the koppie, but every now and then a casualty occurred after they had got up, owing to the enemy firing from the caves. However, gun cotton was soon got and exploded by the Royal Engineers at the mouths of the various caves, and by 1 p.m. all opposition had ceased. I kept the

Bearer Company on the ground until 1 p.m., then marched it to the dressing station, to see if it could be of any service there, and then back to camp.

The following men belonging to the European stretcher-bearers were hit during the action: No. 800 Private Patrick Farrell, 21st Regiment, wound of left arm (slight); No. 3427 Private W. Lovell, Army Hospital Corps, contused wound of leg; No. 2659 Private G. Cherrington, struck on helmet by a spent bullet.

The following is a nominal roll of the Army Hospital Corps, who served with the Bearer Company in the action:—

Regt. No.	Rank	Name	Regt. No.	Rank	Name
3220	Sorjeant ..	W. W. Walter	4031	Private ..	J. Wilson
1514	2nd Corpl.	R. Fearn	3711	,, ..	A. Jones
2205	Lce.-Corpl.	C. Reid	3200	,, ..	J. Rogers
3575	Private ..	F. Harlow	3666	,, ..	T. Keefe
3427	,, ..	W. Lovell	4095	,, ..	J. Dawson
4033	,, ..	D. McWilliam	3460	,, ..	T. Lynch
3623	,, ..	J. Linnett	2598	,, ..	N. McCann
2331	,, ..	P. O'Callaghan	3878	,, ..	W. Frost
2659	,, ..	G. Cherrington	4098	,, ..	W. Phillips

I cannot speak too highly of the manner in which all discharged their arduous and dangerous duties. There was no hanging back at any time, but on the contrary, everyone showed the greatest readiness and desire to do his duty thoroughly. To Surgeon O. E. P. Lloyd I am deeply indebted for the great assistance he rendered during the time we were training the men. Joining, one may say, as a recruit on 3rd November, he worked hard to acquire a thorough knowledge of the work and to impart it to the men, and in both efforts he was signally successful. During the action I can bear the strongest testimony to the courage, zeal, and energy he displayed in the discharge of his duties. The conduct of the regimental men throughout the time they were under my command was exemplary, and the zeal and industry with which they set about acquiring a knowledge of the new drill, as proved by the proficiency which they attained, after only a fortnight's training, was worthy of all praise, whilst their conduct in the field was perfect.

I heartily acknowledge my indebtedness to the Military Authorities of the Transvaal Field Force, for the readiness with which they supplied me with the necessary number of regimental men, and for the support and encouragement they uniformly

afforded me, and to the Surgeon-General[1] for the men of the Army Hospital Corps and the equipment with which he supplied me.

On the morning of 29th November, the day after the battle, I paraded the men of the Bearer Company at the funeral of the men killed in action, with the other troops, and on the 30th, in compliance with orders received from the Senior Medical Officer of the Force, I left them in charge of Surgeon Lloyd, and came down country in charge of a convoy of wounded.

This is the first time that anything like a properly organised Bearer Company has taken part in any campaign of the British Army, and I consider myself highly honoured in having had the organising and handling of it in action. How far it has succeeded in fulfilling the objects for which it was constituted, I prefer leaving it to others who were present, and saw it at work, to pronounce an opinion. I trust, however, that I am not too sanguine in hoping the general opinion will be that the result of this experiment, tried for the first time on a comparatively small scale, affords, to say the least of it, every encouragement for a much more extensive trial of it, in any future campaigns in which our Army may be engaged.

P.S.—I should have mentioned that the mixture of old and new pattern stretchers and ambulances with which we had to work was a source of great inconvenience, and there is, in my opinion, great room for improvement in the construction of the new pattern Field Stretcher. We found that the legs and pins which fasten them were constantly getting out of order.

Pretoria, South Africa, (W. J.)
December 19th, 1879.

[1] Deputy Surgeon-General Woolfryes, now Surgeon-General Sir John Andrew Woolfryes, K.C.B., C.M.G., M.D., K.H.P., retired, Army Medical Department.

Reviews.

HANDBOOK OF TREATMENT FOR DISEASES OF THE EYE (OPHTHALMIC THERAPEUTICS). By Dr. Curt Adam. Translated from the Second German Edition by William George Sym, M.D., F.R.C.S.Ed., and E. M. Lithgow, M.B., F.R.C.S.Ed. With 36 illustrations. London: Rebman Limited. 1911. Price 10s. net.

The fact that within the space of a year a second edition of Dr. Curt Adam's little manual has been called for indicates the appreciation it has met with in Germany, and we welcome its appearance in an excellent English translation. Designed primarily for the use of surgeons in general practice, it brings together in a compact, unpretentious *format* much valuable information on ophthalmic therapeutics, minor ophthalmic surgery, and first aid for ocular injuries; with brief but sufficient descriptions of the more common eye-diseases for the diagnosis of which expertness with the ophthalmoscope is not a *sine qua non*.

The introduction, illustrated by two excellent photographs, deals with methods of examination, of which only two are described, viz., focal illumination and direct illumination. Practitioners, as the author remarks, are often deterred from the use of the ophthalmoscope by simple loss of habit and opportunity to employ it; this is all the more unfortunate, as by these two simple methods they should be able "to diagnose (and to treat) some, at least, of the most important diseases with which patients are likely to be affected."

The first section, giving a detailed account of ophthalmic therapeutics, ophthalmic minor surgery, and modern methods of treatment, is the most valuable part of the book. The authors of treatises on ophthalmology as a rule give scant attention to such details, proceeding on the assumption, too often unfounded, that their readers are familiar with them. Darier's "Leçons de Therapeutique Oculaire," for instance, excellent though it is, is written primarily for specialists, and is far too advanced in its scope for the general practitioner.

In the second section, "Special Part," the more common eye-diseases are rapidly sketched. The best feature of this section is the sharp distinction the author draws between "the diseases which a general practitioner may treat and ought to treat, and those requiring the advice and experience of a specialist."

The short chapter that follows treats, in a very compressed form, of "Refraction and the Choice of Spectacles." The treatment of errors of refraction is emphatically a matter in which a little learning is a dangerous thing, more especially in cases of astigmatism (vide pp. 190, 191, where a long description of the "rising-sun" test for astigmatism is given). On the whole we believe this chapter might with advantage be omitted in future editions, as outside the scope of the work.

The last section, "First Aid in Eye Injuries," is quite excellent, and, so far as we are aware, has no counterpart in other works.

A large number of prescriptions are appended, and will be found of service by the specialist as well as the general practitioner.

M. T. Y.

REPORT OF THE GOVERNMENT BUREAU OF MICROBIOLOGY, NEW SOUTH WALES, FOR 1909. By Frank Tidswell, M.B., D.P.H., Director.

This comprehensive work deals with original investigations of matters of local importance connected with human, animal, and vegetable pathology and hygiene.

Charts are given which show the seasonal prevalence of the flea (*Læmopsylla cheopis*) and plague infection in rats and man. The coincidence of the curves affords confirmatory evidence of the active agency of this insect.

The other rat fleas, *Ctenopsylla musculi* and *Ceratophyllus fasciatus*, play no part in the propagation of plague in New South Wales.

On comparing sixteen strains of plague bacilli it was found that they all formed acid in glucose media, and in mannite also, with two exceptions. Dulcite and lactose were unchanged. Morphologically the cultures varied from coccoid forms to rods, as long as the typhoid bacillus. The characteristic wavy or curled "snakes" were present in most of the growths.

Vaccine therapy has not been uniformly successful. Staphylococcic vaccine benefited six cases of acne, but failed in four. Streptococcic emulsions cured three cases of puerperal septicemia; in two they were without effect. A case of puerperal pyocyaneus infection responded rapidly to a pyocyaneous vaccine.

Friedländer vaccine failed in five infections of the air passages.

Coli vaccines proved of service in three instances of kidney or bladder invasion, but no improvement was noted in five other cases. Streptothrix injections gave no appreciable result in cases of actinomycosis. A patient who suffered from tubercle of the kidneys was remarkably improved by tuberculin.

A slender spirochæte, with fewer spirals than the *Treponema pallidum*, was found in three cases of ulcerating granuloma of the pudenda of natives.

In the course of examining films of the blood of the bird Meliornis spirochæte-like bodies were observed. They proved to be spermatozoa set free by an injury to the testicles.

Malaria, prevalent in Northern Australia, is not endemic in New South Wales, though anophelines exist in abundance.

Nine pages of the report are devoted to worm nests in cattle. These are fibrous nodules which contain in their centres much-coiled nematode worms, *Onchocerca gibsoni*. As over 50 per cent. of Australian cattle harbour these pests, and the tumours are found in the frozen carcases imported from Australia, the subject has attracted attention in the British Press. Meat thus infected has been consumed during the last thirty years without any evidence of its prejudicial effect on man.

Out of many patent disinfectants tested, Cyllin and Zondo gave the highest Rideal-Walker coefficient, but the author considers that too great stress should not be laid on the value of this method of determining bactericidal efficiency.

Attention is drawn to a fact which is often forgotten. It is frequently more convenient to restrict bacterial development in a fluid such as milk by maintaining its temperature at 50° to 55° C. than by refrigeration. Boric acid, even in quantities as high as 500 grains per pint, was found incapable of sterilising milk in eleven days.

Fifty telephone mouthpieces were examined bacteriologically without the detection of any pathogenic microbe.

This report, which we trust is the forerunner of others as valuable, bears eloquent testimony of the versatility and scientific activity of Dr. Tidswell and his staff. C. B.

RACTICAL BACTERIOLOGY, BLOOD WORK, AND ANIMAL PARASITOLOGY, INCLUDING BACTERIOLOGICAL KEYS, ZOOLOGICAL TABLES AND EXPLANATORY CLINICAL NOTES. By E. R. Stitt, A.B., M.D., Surgeon, United States Navy; late Instructor Tropical Medicine, United States Naval Medical School. Second Edition, revised and enlarged. 1911. H. K. Lewis. Price 6s. 6d. net.

The fact that a second edition of this handbook now makes its appearance indicates that this manual, first published in the year 1909, has supplied a want. We commend it to officers of our Corps on account of its accuracy and conciseness, since it contains information which usually must be gathered from various sources. There are few points to which we take exception in its pages. We think that the evidence available does not justify the description given of *Cytorrhyctes vaccinæ*, *C. variolæ*, *C. luis*, and *C. scarlatinæ*, the existence of which is contested by most observers.

Though useful for demonstrating the coarser spirochætes, Burri's Indian ink method is now discredited as a means of detecting the *Treponema pallidum*. In future editions we shall look for a more extended notice of dark ground illumination, which has come to play such an important part in the diagnosis of syphilis. No mention is made of the precipitin and complement fixation tests in the detection of hydatid disease. The numerous keys, tables, and illustrations facilitate a speedy laboratory diagnosis, now required by the advance of medical science.

C. B.

MILITARY SANITATION AND HYGIENE. By Captain E. Blake Knox, R.A.M.C. London: Baillière, Tindall and Cox. Pp. xii. and 346. 6¾ in. by 4½ in. Price 5s. net.

After reading the book with some care one comes to the conclusion that it has been compiled for the benefit of officers of the Royal Army Medical Corps, because great attention has been paid to the sanitary duties of a medical officer in barracks, matters are looked at from a medical rather than from a military point of view, and because the conditions prevailing in the Territorial Force have not been touched on at all, whilst the chapters dealing with camp sanitation are the weakest in the book.

There has long been an opening for a handy pocket reference book for medical officers, containing reliable information in connection with their sanitary duties, and supplied with references to regulations and literature. In some ways this book meets the need; it is a compendium of a large amount of valuable information, but unfortunately the compiler has not always stopped to verify his references and has fallen into several of the traps which beset the unwary in the art of compilation. Such slips are fairly clear indications of the source of the information supplied, and the compiler of a book of this nature would do well to read the official documents instead of taking his extracts second-hand from text-books.

Fortunately many of these instances are of little importance, but there

is one sentence which, while illustrating this point to some extent, is important for another reason. In connection with the care of barracks one finds a sentence taken from paragraph 169 of the official Manual of Sanitation: "Foul drains . . . are in charge of the Royal Engineers, but are sometimes opened, inspected and flushed by soldiers under Royal Engineer supervision." The Manual here adds the words: "(See Instructions in the care of Barracks)" and in those instructions we see that the unit has very distinct duties in connection with its foul drains laid down in the Regulations for Engineer Services and the King's Regulations. The omission of the words in brackets encourages the pernicious doctrine, too often held by the regimental officer, that the foul drains concern the Royal Engineers alone.

In connection with the subject of sanitary responsibility on field service a curious table is given by which the responsibility for the sanitary condition of the quarters of a division appears to be equally divided between its commander, the Administrative Medical Officer and his assistant; that in a brigade between the General Officer Commanding and the Senior Medical Officer. Apart from the fact that the expression Senior Medical Officer of a brigade does not occur in our regulations or establishments, the idea that the General Officer Commanding shares the responsibility with one or more of his subordinates is an extraordinary one.

In the chapters on camp sanitation, which should be the most important part of a work of this class, we find a mass of undigested material. In the section which deals with the disposal of waste water in a camp we have a jumble of two things, first the prevention of wastage of water and second the disposal of used water. For the latter the compiler appears to recommend as a routine measure the unusual course adopted at the training camp of the Fourth Division at Churn in 1909, where a great length of 4-inch iron pipe was laid along the surface, through which the waste water was forced by means of a steam pump. Such an arrangement was necessary because at the last moment it was found that the surface soil of the camp was unabsorbent over the greater part of its area; it is not likely that such an arrangement will ever again be adopted, at any rate by the Fourth Division.

Special chapters on marching and physical efficiency are included which give the latest available work on this important branch of the subject, a branch on which it was until lately very difficult to obtain reliable information.

In spite of many slips and faults the book will doubtless be useful as a reference handbook for those who have sufficient knowledge to avoid and correct the inaccuracies, and who have already sufficient knowledge of camp sanitation; for the seeker after knowledge it cannot be recommended, and for the reasons given above it is not a suitable book for officers of the Territorial Army. C. H. S.

HÆMOGLOBINURIA. By Ambrose E. L. Charpentier. London: Baillière, Tindall and Cox, 1910. Pp. vii. and 111. Price 3s. 6d. net.

This is a small essay of some ninety-two pages on hæmoglobinuria, chiefly paroxysmal. With the exception of the record of two cases which have been under the author's care, it contains no original observations. It contains, however, an excellent compilation on the literature of hæmo-

globinuria as well as a very full bibliography; these should be extremely useful to any one working at the subject. W. S. H.

AIDS TO BACTERIOLOGY. By Moor and Partridge. Second Edition. Baillière, Tindall and Cox, 1911. Price 3s. 6d. net.

The art of compression has been so well exercised that the information given in this small volume is much fuller than we should have expected from its title. In compiling the second edition the authors have taken great care to ensure accuracy and acquaintance with recent advances in bacteriology. It appears to us that it is unnecessary to refer to Bastian's ancient experiments, except as a warning against the use of imperfectly sterilized media. Among methods which might have been mentioned, are Muir's capsule-staining process, that for rapidly hardening tissue by acetone, that for distinguishing bovine from human tubercle bacilli by inoculation of rabbits, and that for the detection of scanty tubercle bacilli in sputum by means of antiformin. It might have been noted also that smears of brain tissue of rabid animals from the neighbourhood of the *hippocampus major*, fissure of Rolando, and cerebellum contain the Negri bodies in greatest numbers. This is important, since by this means the diagnosis of hydrophobia can be made without delay. C. B.

Current Literature.

Sterilisation of Drinking Water by Means of the Ultra-violet Rays, with a Description of a new Portable Apparatus for Use in the Field (*Deutsche Militärärztliche Zeitschrift*, June 5th, 1910).

A Portable form of Water Steriliser employing Ultra-violet Rays for Use with existing available Sources of Electric Current. By Dr. Deeleman, Oberstabsarzt (*Deutsche Militärärztliche Zeitschrift*, March 20th, 1911).—The author in the first paper above noted begins by giving an account of the discovery of the ultra-violet rays and a historical sketch of the work done on the subject of sterilisation of water by means of these rays, and the development of the quartz mercury vapour lamp; he then describes some of the forms of lamp in use. In the latest manufactured by the Quarzlampengesellschaft of Hanau, the lamp consists of a comparatively short incandescent tube of quartz of an "H" shape. This is immersed in the water that is to be sterilised, which flows through the chamber in which the lamp is contained, leaving at a level only slightly higher than that at which it enters. The lamp is started by moving the tube much in the same way as in the case of the Westinghouse steriliser described in the February number of this Journal (pp. 167 to 178). The company have at present two lamps on the market, the 110 volt model with an arc length of 6 cm. (2·4 in.) and 220 volt model with an arc length of 13 cm. (5·2 in.) These work only with the continuous current. The amount of light given depends on the strength of the current. Theoretically the life of such a lamp is unlimited. In the Nogier apparatus the lamp is enclosed in a metal container of about 1 litre capacity. The lamp consists of a tube about 15 cm.

(6 in.) long with ampulliform ends in which the mercury is contained. The container is divided by a partition into two compartments, one of these being about twice the size of the other. The water during sterilisation passes from the larger to the smaller through a narrow aperture. A small observation window is left in the metal casing of the chamber. The lamp is started by pulling on a chain which at the same time opens a tap allowing the water to pass through. If at any time the lamp should go out, the consequent breaking of the circuit will at once turn off the water. In the Billon-Daguerre lamp the water is led from the quartz-mantle through knee-shaped silver tubes, which compel it to pass in very thin streams between the lamp and the exit tubes. This lamp is guaranteed to sterilise 60 litres (13 gallons, 1 pint) per minute with a current of only 2 amperes running at 110 volts. Lately Billon-Daguerre has suggested that an equally good result might be attained by the use of even less electricity, employing rays of even shorter wave length, in fact hyper-ultra-violet rays. For this purpose he uses a Crookes' tube, and claims to achieve results as good as those shown above with an expenditure of only 2 amperes at 5 to 6 volts pressure. In his latest apparatus he uses a quartz tube 25 cm. (10 in.) long and 2 cm. (0·8 in.) in diameter. This is filled with highly rarefied hydrogen and connected with the secondary current of a small induction coil having a spark 0·6 in. in length. The coil is worked with a current of 2 amperes at 6 volts. This extremely small amount of electricity is transformed almost entirely into invisible rays of extremely short wave length, and of great chemical activity.

The portable apparatus suggested by the author consists of the following parts:—

(1) A fixed 2½ h.p. petrol motor engine.

(2) A cylindrical or rotary pump of 25 to 40 litres (43 pints) per minute capacity.

(3) A shunt wound dynamo of 1·35 kilowatts at 135 volts.

(4) Two roughing filters.

(5) Two fine filters.

(6) Two sterilising chambers.

(7) A switch board for the regulation of the dynamo and the electric fittings of the sterilising chambers.

(8) Tubes for water connection.

He calculates that for both sterilising chambers he will need Nogier's estimate of 10 amperes at 139 volts. Adding the power necessary for this to that for pumping the water through the pipes at 10 litres (17½ pints) per minute, the author arrives at 2½ h.p. as being required from his engine. This is of the type used on small high-speed motor cars and is coupled directly to the pump and the dynamo, so that the former can be thrown out of gear when required. In this way a considerable saving of weight is effected, and the disadvantages inherent to belt driving avoided. The water is first pumped through the roughing filter, which is filled with coarse wood charcoal or small coke, with a thin layer of cellulose. This keeps back all gross impurities such as sand and large particles of organic matter.

By a simple attachment of a nozzle regulated by a valve it is possible to aerate thoroughly the water in the pump tube, by which means if there is any iron present a fine film of hydrated oxide of iron is deposited on

the filtering material, and thus the straining action of the latter increased. When necessary the flow can be reversed to clean out the filter. From the roughing filter the water passes on to the fine filters. These are duplicated so that either side of the apparatus can be thrown out of action for clearing if necessary. For these the author recommends the use of Berkefeld filter candles. From the fine filters the water passes through electrically regulated valves, one on each side, to the two sterilising lamp chambers where it is exposed to the action of the ultra violet rays, being subsequently discharged through two delivery pipes as germ free water. The switch board carries a main switch, one ammeter, one volt meter, the regulating handle of the dynamo, fuses for dynamo, and lamps, and the switches for the latter. A permanent resistance is intercalated in the connections to each lamp to avoid any injury. The inlet valves of the lamp chambers are regulated by means of the lamp switches. The whole apparatus is carried in a four-wheeled wagon. The coarse filter is at the front of the vehicle, behind this comes the motor with its radiator, and behind that again the dynamo. The fine filters and the lamp sterilising chambers occupy the rear part of the wagon. The switch board is placed vertically at the back of the cart, and the pure water discharge pipes are situated immediately below. The pump is placed in front immediately under the coarse filter. The apparatus is worked as follows:—

(1) The engine is started, both pump and dynamo being disconnected.

(2) When the motor has attained a high speed the pump is coupled up, after having been first filled with water. A tap at the entrance to the roughing filter shows if the pump is acting.

(3) The water is now forced on through the fine filters, and another tap shows when it has penetrated through these.

(4) The regulator of the motor is now so placed that the current which will pass through will be one volt above the working resistance of the lamp, and the main switch is then closed.

(5) If now one of the lamps is switched on it at once begins to work, and at the same time the regulating tap of that lamp allows water to pass through, and sterilisation is effected.

If, owing to the impurity of the water, the flow becomes checked, the fine filter first implicated can be at once removed and cleansed in the usual manner. If the flow continues obstructed it is only necessary to reverse the action, through the roughing filter, and so wash it out. The first water delivered from the discharge pipes should be allowed to run to waste.

According to the author this cart could be adapted for use with Billon's suggested Crookes' tube, supposing that the anticipations of that worker are fulfilled. A few alterations only would be needed to meet the increased delivery.

The entire weight of this installation is 1,100 kilogrammes (1 ton, nearly). The breadth of the track is 1·4 metres (4 ft. 8 in.), distance between axles (wheel base) 2·45 metres (8 ft. 2 in.)

In the second article mentioned in the heading, Dr. Deeleman describes a portable ultra-violet-ray apparatus, designed for use with any available source of electric current, as, for instance, the field Röntgen wagon, or the wireless telegraphy apparatus. A small transformer is needed to alter the current to one of 200 or 100 volts.

The fore part of the carriage is adapted so as to be capable of being

limbered on to the other vehicles just mentioned. These would need also to be adapted for this purpose. The pole is provided with props to support the steriliser when detached. The general construction is as follows. A filter is mounted on a light framework or chassis of angle iron, with good spring. Only one filter is provided, it having been found unnecessary to provide both coarse and fine straining, the former being sufficient. On the upper surface of this filter there is an electrically controlled valve, and the sterilising lamp chamber, through which the water passes after straining in the filter. The power is supplied by means of a semi-rotary pump, which is connected with the filter by three stop cocks. The lamp is provided with a wire and contact plug for attachment to the source of electricity. The apparatus is worked as follows: By opening the upper and lower of the three cocks and closing the middle one, water is pumped into the filter from above and allowed to run to waste. Any obstruction in the filtering material is thus removed. The middle cock is now opened and the other two shut. This leads the water through the filter, and then as soon as the electrically controlled valve is opened through the sterilising chamber, and so to the delivery pipes.

The expenditure of current is extremely slight. A Nogier lamp which will give a sterile delivery of 10 litres (seventeen ½ pints) per minute, demands only 1·5 amperes at 110 volts. The weight of the installation is a little short of two tons.

The writer concludes his article by laying emphasis on the superiority of the ultra-violet rays to other forms of sterilisation, *e.g.*, boiling and chemicals, since it adds nothing to the water, and in no way affects its taste or character. C. H. M.

Laboratory Report, March 2nd, 1911, The Department of Health, Commonwealth of Pennsylvania.—*Micro-organism found in the Blood of Acute Cases of Poliomyelitis.*—S. G. Dixon, H. Fox, and J. B. Rucker state that "In examining the blood from acute cases of Poliomyelitis in the human beings and also in monkeys in which the disease was produced experimentally an organism was found, different in morphologic characteristics from any heretofore described, which may or may not, on further investigation, prove to be the etiological factor in the causation of the disease. Blood-smears being fixed in methyl alcohol for one minute and stained with carbol-thionin, the organism appears as a faintly stained blue rod with regular cell wall about 10 microns long and about 8 microns in width, curved at an angle of sixty to seventy-five degrees at one end, occasionally at both ends. At times, the curved end is bulbous. Some of the organisms appear to have a very finely granular protoplasm when the highest amplification is employed. They may be discerned by means of a 4 mm. dry objective, but their characteristics are much more satisfactorily delineated under the 1·12 oil immersion lens. They are found free in the serum as well as within the body of the red blood cell.

"The organisms do not retain the violet colour when stained by he method of Gram, but assume the colour of the counter stain, which, as generally used in this laboratory, is a very dilute solution of carbol fuchsin.

"The bloods examined w re from ten different cases of acute polio-

myelitis in children, and were taken during the epidemic of last summer and autumn, and from thirteen cases of the disease during the acute stage, which had been produced experimentally in as many monkeys.

"Blood-smears from three normal human beings were carefully examined, and although the search for these organisms was diligently made, none were found. Smears were made from the bloods of thirteen normal monkeys with negative results. After inoculation with the virus these same monkeys gave positive results. The blood of other normal monkeys gave negative results.

"Blood-smears were stained with iodine and sulphuric acid in order to test the organisms for cellulose, but no blue-stained organisms were seen.

"Smears from the cords and brains of paralysed monkeys and from one human case were examined, but none of the new organisms were found.

"Filtered virus stained with carbol-thionin and by Gram's method showed none of these organisms.

"Defibrinated blood, three weeks to two months old, from two paralysed monkeys showed the forms in increased numbers.

"Cultures made from the blood of a paralysed monkey, in blood bouillon, and blood agar, examined after having been inoculated three weeks, showed the presence of the organism in increased numbers. Dorsett's egg medium was inoculated with the same blood at the same time, but the organism was not found in smears from the surface of the medium or from the water of condensation.

"We have searched without success for moving organisms in fresh blood, in old tubes of defibrinated blood from paralyzed monkeys, in blood bouillon, plain bouillon, serum bouillon cultures three weeks old, and in the condensation water in three weeks old cultures on Dorsett's egg medium under dark field illumination.

"Success in isolating the organisms has not attended our efforts as yet."

National Vigour the Basis of Army Efficiency.—By Major-General von Gersdorff (*Jahrbücher deutsche Armee und Marine*, November, 1910). In this article von Gersdorff shows how, in countries having universal service, the efficiency of the army depends on the existence of a healthy, vigorous population. He deplores the tendency for the best and brightest of the population to migrate from the country to large towns, where even under the best hygienic conditions the robustness of the inhabitants cannot be developed to anything like the same extent as in the country.

To succeed in the world, either in the army or in civil life, man must be a good animal; mere intellectual excellence is not sufficient, and it is therefore a mistake to devote so much of our energies to the mental training of youths while neglecting their physical development. Strange to say, poor physique is to be found among the well-to-do classes to almost as great an extent as amongst the poor.

The statistics of births in the German Empire also give rise to anxious thought. In 1895, 1,941,644 persons were born, the ratio per 1,000 inhabitants being 37·34; since then a steady diminution in the ratio has set in, and in 1907 the number of births was 2,060,973, the ratio being only 33·20 per 1,000.

In France the diminution in birth-rate began in 1825; for the next fifty years the average decrease was 500 per annum, but for the following twenty-five years, *i.e.*, from 1875 to 1900, the annual decrease was roughly 4,000, while from 1900 to 1907 it amounted to 12,000. In 1907 there were actually 33,000 fewer children born than in 1906. This constant diminution will, in the course of the next fifteen to twenty years, have the effect of reducing the peace strength of the national forces by 50,000 to 60,000 men. The writer thinks that signs are not wanting to show that Germany is beginning to follow in the footsteps of France. He then gives a table showing the numbers of men who become liable for military service in the German Empire in each year and the number found fit for service:—

Year	Liable for service	Fit for service	Percentage fit
In 1895 ..	489,388	266,709	54·50
1900 ..	507,936	282,581	55·60
1907 ..	530,334	280,774	54·4

Thus, since 1900 the percentage of men fit for service has steadily decreased. Germany is still young as a great industrial country, and many of the parents now living in cities were brought up in the country. The benefit of a country life is shown by the statistics for recruiting; thus in East Prussia, which is mainly agricultural, of the male population liable to military service, 65 per cent. is found fit; in contrast to this, Brandenburg, which includes Berlin, has only 43 per cent. of its male youth fit for service. Among the more highly-educated youths who present themselves as one-year volunteers the percentage of unfit is relatively high.

The value of gymnastics in developing physique is shown by the Swiss statistics. In 1907, of the total number due for service 62 per cent. were found fit; of those who had not had any gymnastic training only 56 per cent. were found fit; of those who had only practised gymnastics while at school 59 per cent. were fit, while of those who had continued gymnastics after leaving school and up to the time of enlistment 73 per cent. were fit.

Von Gersdorff concludes with an appeal to all public and governing bodies, but especially the army authorities, to do all in their power for the physical improvement of the race. He points out that the more vigorous races have always swallowed up those of inferior physique and that the same process will undoubtedly continue in the future. Physical development during the school period is of the greatest importance to a nation, but the process should be continued up to the period of military service.

C. E. P.

Diagnosis of Plague.—Méd. Major Broquet (*Annales d'hygiène et de Médecine Coloniales*, No. 3 of 1910) describes the procedure followed in Anam during an epidemic of plague. Bacteriological examinations could only be carried out at the Pasteur Institute, Saigon, but in that climate it was difficult to prevent decomposition *en route* of the tissue sent for investigation. After numerous trials the following procedure was found to yield satisfactory results:—

A gland was taken from the corpse as soon as possible after death, care being taken to prevent accidental contamination.

The gland was placed in a flask containing the following sterilised solution :—

Neutral glycerin (30° B.)	22 cc.
Distilled water	80 ,,
Carbonate of lime	2 grm.

The mouth of the flask was flamed and sealed up, a distinguishing number attached, and it was then sent by the quickest route to the Pasteur Institute. On arrival at the Laboratory, a portion of the gland was removed, wiped with sterilised paper to remove the glycerine, and pounded into an emulsion with 2½ cc. of normal saline solution. 1 cc. of the emulsion was then injected into a guinea-pig and ½ cc. into a rat.

The gland did not undergo decomposition and the plague bacilli retained their vitality. A definite diagnosis could thus be obtained in three or four days. C. E. P.

Surgical Dressings for Wounds in the Field.—Oberstabsarzt Bronislav Majewski, *Militärarzt*, October 14th, 1910, reviews the treatment of wounds in the field. He strongly favours the following dressing : A layer of HgO vaseline gauze is loosely applied to the wound, and over this sterile absorbent wool or gauze. The absorbent layer can be changed, but the HgO vaseline gauze is left for four to five days. In extensive phlegmonous inflammation he makes small incisions and inserts drains of HgO vaseline gauze. For chronic inflammatory processes he recommends dressings dipped in 20 per cent. nitrate of silver solution ; they must be changed daily.

HgO vaseline gauze is prepared by placing 1 metre of gauze in a mortar along with 31 grammes of 10 or 20 per cent. HgO vaseline and pounding the two till all the vaseline has become absorbed. C. E. P.

The Value of a Diet containing Little Sodium Chloride. Regimentsartz W. Presslich, *Militärarzt*, November 11th, 1910.—The writer reviews the literature on recent investigations into the physiological action of common salt on the tissues. Javal, Widal, and Lemièrre first showed that inflammatory conditions of the kidneys caused a great diminution in the excretion of common salt in the urine and its retention in the system. If patients suffering from inflammation of the kidneys continue to take the usual quantity of salt, say 10 to 12 grammes daily, œdema rapidly ensues, which disappears again when the quantity of salt in the diet is restricted, *e.g.*, by only allowing a plain milk diet. The proportion of salt in the blood remains constant ; retained salt is taken up by the tissues. The organism endeavours to maintain the isotonic condition of the body fluids, hence the tissues take up and retain a large quantity of fluid, producing œdema. When the quantity of salt ingested is reduced the blood draws on the retained salt in the tissues, which in turn part with the retained fluid and the œdema disappears ; the work of the heart is at the same time greatly diminished. This accumulation of salt in the tissues also takes place in arteriosclerosis, gout, and acute infective diseases, especially pneumonia. C. E. P.

Infantile Kala-azar in Southern Europe.—The *Arch. f. Schiffs- und Tropen-Hygiene* (Heft 6, Bd. xv., 1911) gives some interesting abstracts on the occurrence of kala-azar in dogs and children in Southern

Europe. The first paper by Basile (*Real. Accad. dei Lincei*, Bd. xix., 6th number), gives the results of examining dogs in Bordonaro, near Messina. Gabbi had demonstrated the existence of endemic infantile kala-azar in this town. Basile examined thirty-three dogs belonging to houses in which the disease had occurred. In twenty-seven of these he found typical Leishman bodies in the bone marrow of the femur. In Rome, where up to the present kala-azar has not been recognized, sixty dogs were examined; in sixteen cases Leishman bodies were found in the spleen or bone marrow.

A second paper by Basile (*Real. Accad. dei Lincei*, Bd. xix., Series 5, 10th number) contains further observations on the occurrence of kala-azar in dogs. He describes two forms, acute and chronic. The former attacks mainly young dogs; it is characterised by general depression, irregular pyrexia, wasting and loss of power in the hind quarters; it usually terminates fatally in four to five months. Leishman bodies are numerous in the spleen, bone, marrow and liver. The chronic form seems to be more common in old dogs, which show few or no symptoms, but the spleen is generally enlarged. Basile believes that both forms occur in children, and that the acute form in dogs may be conveyed to children, by means of dog or human fleas; he thinks that ticks and bugs are not concerned in the transmission of the disease.

Some experiments undertaken to investigate this point (*Real. Accad. dei Lincei*, Bd. xx., No. 1) appear to show that dog fleas, fed on infected spleen pulp, take up Leishman bodies, and that these multiply in the flea's gut. This favours Basile's opinion that the disease is transmitted by dog or human fleas.

Alvarez and da Silva (*Med. Cent.*, 22 v., 1910) report a case of kala-azar in a nine-year-old girl in Lisbon. Spleen juice obtained by puncture from this case was inoculated into a dog; fourteen days later, Leishman bodies were found in the dog's liver. C. E. P.

Salvarsan in the Treatment of Syphilis. Professor Werther (*Münch. Med. Woch.*, March 7th, 1911).—Werther, in a long article, discusses the effect of salvarsan on syphilis, especially in regard to fresh manifestations after its use and its action on the cerebral nerves.

He has treated some 350 cases with this remedy and states that he has never seen a generalised eruption appear after its use. This supports Ehrlich's view, that recurrences are due to a few spirochætes, which by being enclosed in a thrombosed vessel have been protected from the action of the drug. For the same reason the Wassermann reaction may be negative in spite of a local manifestation, because the spirochætes are few in number and limited to the part affected.

As regards the Wassermann reaction, Werther found that of the cases treated by him with salvarsan in October, 1910, the reaction only became negative in 12 per cent., while at the time of writing, with the improved technique employed, a negative reaction is found in 50 per cent of the cases, between the twelfth and forty-second day following the injection. The combination of mercury with salvarsan has a more rapid effect on the reaction than a second dose of salvarsan.

Werther also quotes a number of cases in which the auditory nerve became affected after an injection of salvarsan, but after analysing each case he concludes that the damage was caused by a local focus of spirochætes and not by the salvarsan. C. E. P.

Salvarsan and Optic Neuritis. Schanz (*Münch. Med. Woch.*, March 7th, 1911.)—Schanz reports two cases, each of which some three months after receiving an injection of 0·5 grammes of salvarsan, developed optic neuritis, with marked disturbance of vision. In each case the lesion was typical of the condition not uncommonly found in secondary syphilis. In both cases, as soon as the condition was recognized, 0·6 gramme of salvarsan was injected, after which the lesion rapidly cleared up completely, so that, as Schanz remarks, the trouble could hardly have been due to salvarsan poisoning. C. E. P.

The Effect of Salvarsan on Tuberculous Lesions. Herxheimer and Altmann (*Deutsch. Med. Woch.*, March 9th, 1911).—These writers report four cases suffering from syphilis, in which a latent tubercular focus assumed an acute form after an injection of salvarsan. In the first three cases this activity subsided again, and no material harm was done to the patient; the fourth died of pulmonary embolism, resulting from thrombosis of the femoral vein.

In order to test the effect of salvarsan on tubercular lesions, four cases of lupus were injected with 0·3 gramme of salvarsan, one of them on three separate occasions. A few hours after each injection the patch of lupus became acutely inflamed and painful, and the patient suffered from general malaise. The inflammation lasted from two to ten days, and subsided with general desquamation of the patch, leaving it apparently in exactly the same condition as it was before the injection.

The authors think that salvarsan exerts a slight disintegrating effect on the tuberculous nodules, and so frees a small quantity of tuberculin which produces the local reaction. They quote some other cases, in which latent foci of tubercle were not apparently influenced by an injection of salvarsan. C. E. P.

Salvarsan in Frambœsia. Strong (*Arch. Schiff. Trop. Hyg.*, Heft 6, Bd. xvi., 1911).—This writer has treated twenty-five cases of frambœsia, in Manilla, with salvarsan. In all cases improvement began a few days after the injection, and in most cases all manifestations had completely disappeared in twenty days. Only a single injection of 0·5 gramme was used for adults, and no relapses had been noted during the following six months. The writer concludes that salvarsan has a specific action on *T. pertenuis*. C. E. P.

Iodoform and Fleas. Zushitza (*Archiv. Schiffs. Trop. Hyg.*, Heft 6, Bd. xvi, 1911).—The writer states that iodoform is a most effective means of banishing fleas, and that a trace of this drug on one's clothes is sufficient to keep all fleas at a distance. It should, therefore, be a valuable prophylactic in plague-infected districts. C. E. P.

Chinese Mosquito Lamp.—Dr. Olpp describes a Chinese lamp which is used for the destruction of mosquitoes. This simple little lamp is made of any kind of metal, is ovoid in shape, and burns either native or paraffin oil. The upper part of the lamp is removable, has a small opening at the top, and a larger one at the side, with everted projecting edges, very much like a bicycle lamp. The lighted lamp is held against

a mosquito curtain, wall, or other resting-place of the mosquito, so that the bell-shaped opening encloses the mosquito; the insect immediately flies into the flame and is destroyed. In this way all mosquitoes in a room can be rapidly got rid of. C. E. P.

The Influence of Aviation at Great Heights on Arterial Tension. —Dr. Moutinier, in the *Gazette hebdomadaire des sciences médicales de Bordeaux*, publishes a series of observations on arterial tension before and after flying at great heights. After descending from a height of 5,000 to 6,000 feet, the aviator shows cyanosis of the extremities, probably caused by the low temperature at high altitudes; frequently the vessels of the conjunctiva are noticeably congested. If the aviator is in training, palpitation or epistaxis does not occur, but there may be slight headache and buzzing in the ears. The pulse rate and arterial tension are increased by ascents to heights of 3,000 to 6,000 feet, but not by ascents up to 400 feet. The alterations in blood pressure are due to the low atmospheric pressure at high altitudes, while the sudden descent in an aeroplane does not allow sufficient time for the heart to adjust itself to the changes in barometric pressure. C. E. P.

Two Cases of Poisoning by Melinite. By Méd. Maj. Romary (*Le Caducée*, November 19, 1910).—The first patient was employed in cleaning out cylinders which had contained melinite. In doing so a good deal of the explosive adhered to his hands, in spite of which he ate a loaf of bread while doing his work. This bread had a distinctly bitter flavour. He noticed nothing unusual until about 7 p.m., when he was suddenly seized with a sharp attack of colic followed soon after by diarrhœa. He slept well during the night, but passed six bilious stools next day, and eight more during the following night. The urine was much diminished in quantity, brick-red in colour, and contained an excess of uric acid, but no picric acid. The colic persisted up to the third day, when it ceased after the administration of a small dose of opium. There was no headache or any other unpleasant symptom. The second patient had to handle melinite for two hours, and in doing so inhaled large quantities of melinite dust. He noticed a bitter taste in his mouth. Before eating he carefully washed his hands. The bitter taste persisted next day, but as there was no other unpleasant symptom he continued to perform the same work. The same night he was unable to sleep, and got up in the morning with a violent headache accompanied by giddiness, buzzing in the ears, muscular tremors and cramps. The urine was scanty and of a brick-red colour loaded with urates, but picric acid could not be detected. There was also slight pyrexia. These symptoms continued for two days and then rapidly cleared up. They were not appreciably influenced by any treatment. C. E. P.

Correspondence.

CONTINUED FEVERS IN SOUTH AFRICA.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—The following case is of interest with reference to the question of the existence in South Africa of a continued fever which is not enteric fever, paratyphoid or Mediterranean fever:—

No. 7523 Private O., 2nd Hants Regiment, was admitted to hospital at Roberts' Heights in October, 1909, suffering from a continued fever which was diagnosed as enteric fever, but which presented peculiar characters. He had the profuse macular rash characteristic of the type of fever described by Brill in the *American Journal of Medical Sciences*, April, 1910. I described similar cases in a clinical note which appeared in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS for February, 1908. At that time I had not seen Brill's earlier papers, in which he described this disease as a peculiar form of paratyphoid, an opinion he has now abandoned.

While in hospital at Roberts' Heights, Private O.'s serum gave a "slight" positive reaction with *Bacillus typhosus* in $\frac{1}{30}$ dilution in one hour; it failed to react with *B. paratyphosus* B. On February 20th, 1911, Private O. was admitted to hospital at Wynberg, showing the clinical signs and symptoms of enteric fever. A few rose spots were present. He appeared to be in the end of the second, or beginning of the third week of illness, though he had not previously reported sick. His serum, taken on February 22nd, failed to react with *B. typhosus*, though it reacted with *B. paratyphosus* B. in $\frac{1}{60}$ dilution in half an hour. He was so ill that it was decided not to take blood from a vein for culture; no growth was obtained from blood taken from the finger. He had a succession of small hæmorrhages from the bowel, and died of heart failure on February 25th.

At the *post-mortem* examination Peyer's patches were found ulcerated and sloughing, and the solitary follicles in the lower part of the small intestine swollen. From the appearance of the bowel the disease must have lasted at least two weeks. The spleen was much enlarged. No signs of a former affection of Peyer's patches were observed. The only evidence of any previous disease noticed was an old adhesion of the head of the pancreas to the duodenum.

I took cultures from the heart blood, gall bladder and spleen, and in each case recovered *B. typhosus* in pure culture. The cultures were made in ordinary peptone broth, on agar, and in sodium taurocholate peptone broth. The broth cultures were plated out on Fawcus-Conradi medium after incubation. Serum gave positive agglutination results in $\frac{1}{60}$ dilution both with *B. typhosus* and *B. paratyphosus* B.

The case appears to be of interest, as tending to show that "Brill's

fever" is quite distinct from enteric fever. I should add that Private O. had never undergone anti-typhoid vaccination.

I am indebted to Major N. J. C. Rutherford, R.A.M.C., for the opportunity of seeing this case with him, and for information as to its clinical aspects.

I am, &c.,

J. G. McNAUGHT,
Major R.A.M.C.

Wynberg,
March 29th, 1910.

ROYAL ARMY MEDICAL CORPS COMPASSIONATE FUND.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—Last year you were kind enough to publish an article on the origin and present position of the various Corps Funds, which appeared in the issue of May, 1910.

This article was written with a view of affording information to all officers past and present, whether subscribers or not, regarding the funds connected with their own Corps, and it was hoped that, appearing shortly before the Annual Meeting, it might prove of general interest and perhaps stimulate interest in them.

In consequence of the lamented death of His late Majesty, the Dinner was of course abandoned, and the General Annual Meeting was unfortunately a small one. The account of the proceedings appeared in the *Journal* for July, 1910.

This year we shall no doubt have a record attendance, and I should be very much obliged if you could find space in the June number for a few additional notes as to the progress of the Compassionate Funds during the past year. I do not propose to recapitulate anything that has been said before. Those who are interested in the subject can refer to the article which appeared in the *Journal* for May, 1910, and the few points to which I should like to draw attention relate solely to our Compassionate Funds for ex-soldiers of the Corps, their widows and orphans, and for the education of their children.

On examining the accounts for last year which were printed in the *Journal* for February, 1911, it will appear that the amounts contributed by regimental institutes and canteens, &c., to the General Relief (Compassionate) Fund show a slight falling-off as compared with recent years, being only £339 4s. 10d. as against £376 5s. 8d. for 1909, and £372 3s. 5d. for 1908. This I think is to be regretted, especially as the expenditure, although carefully controlled by the committee, has a natural tendency steadily to increase. Thus in 1908 it was £389 14s; in 1909 £402 2s. 11d., and last year £436 19s. 2d. Of this amount (last year) £146 14s. 8d. was for the education of orphan children of soldiers of the Corps, and I am sure that it will be agreed that money could not be better expended, but it must be remembered that the capital sum originally earmarked for education is being gradually spent in compliance with the instructions of

the donors, and when it is exhausted the charge must either be taken over by the General Relief (Compassionate) Fund, or the education of children must be abandoned.

No one would like to contemplate such a misfortune, but I think all officers, especially those commanding units at home and abroad, should look the facts fairly in the face. The average income, mainly from regimental institutes and canteens, for the last seven years is £283 17s. 4d., and the average expenditure for general relief and education of children during the same period is £516 6s. 10d. The companies and detachments subscribing, together with the amounts subscribed during 1910, appear on page 50 of Corps News, published with the February number of the present year.

In addition to this amount £50 was voted from the Royal Army Medical Corps Fund at the General Meeting last year, and I have no doubt that a further grant will be forthcoming this year, but the main support of our compassionate funds for widows, general relief, and education of children must be derived from annual contributions from our own regimental institutes, and in order that they may be adequately maintained we should have an assured annual income of nearly £500.

We are all right for another year or two whilst there still remains unexpended capital specially devoted to education, but I think it would be an advantage to discuss the question of increasing the annual income of this fund at the General Meeting, or we may shortly find ourselves compelled to refuse the charge of any additional children, in order that those who are already at the various schools may be enabled to complete their education.

The collapse of this branch of the Fund would be a disaster which we should all regret, and this must be my excuse for troubling you with this letter.

Aldershot,
April 18th, 1911.

I am, &c.,
E. M. WILSON,
Lieutenant-Colonel R.A.M.C. Ret.

FURTHER OBSERVATIONS ON THE USE OF "SALVARSAN" IN SYPHILIS.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—By an oversight, which we very greatly regret, we omitted to acknowledge our indebtedness to Staff-Serjeant Gibbons for the very excellent photographs which illustrated our paper on the above subject in the April number of the *Journal*. We feel that our oversight is the more regrettable since we owe to Staff-Serjeant Gibbons's skill with the camera one of the most interesting parts of our paper.

We are, &c.,

Rochester Row, S.W.,
April 15th, 1911.

T. W. GIBBARD.
L. W. HARRISON.
A. S. CANE.

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Original Communications.

A STATISTICAL STUDY OF ANTI-ENTERIC INOCULATION.

BY BREVET-COLONEL R. H. FIRTH.
Royal Army Medical Corps.

Two facts are within the knowledge of most readers of this Journal. They are: (1) that within the last two or three years the incidence of enteric fever among European troops serving in India has diminished; (2) that during the same period the number of soldiers inoculated against enteric fever has increased. The object of this paper is to inquire what light the statistical data, if examined by modern statistical methods, throw upon the view, generally held, that the one fact is mainly the effect of the other. The question is not new, attempts to obtain an answer having been made on several occasions; and more than one series of figures bearing on the point have appeared in this Journal, notably those supplied by Luxmore.[1] To a large extent these contributions have been unsatisfactory, as the deductions drawn from them have been based on percentages which, apart from their probable errors, is a method likely to lead to wrong conclusions. A notable exception among the previous literature on this subject is the paper by Maynard,[2] but owing to the sparseness and unreliability of much of the material with which he dealt, even

[1] Luxmore: JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, vol. viii., p. 492.
[2] Maynard: *Biometrika*, vol. vi., p. 366.

Maynard's paper cannot be accepted as having furnished a final dictum. At the present time we are in a more favourable position, as the conditions relating to both the quantity and quality of the statistical data at our disposal are better than those available when Maynard wrote his article. We do not claim for this contribution any special merits, nor are the data, on which it is based, perfect; still, in spite of this, we hope it may be deemed worthy of perusal.

We need, first, to show what is the evidence in support of the statement that enterica is less now than formerly among European troops serving in India. By the term enterica is meant that group of cognate infections which includes not only the classic disease commonly called enteric fever but also the less understood infections known as paratyphoid fevers. It is unnecessary to go farther back than five years. In 1906 there were 1,095 cases with 224 deaths; in 1907 there were 910 cases with 192 deaths; in 1908 there were 1,001 cases with 190 deaths; in 1909 there were 639 cases with 113 deaths; and in 1910 there were 350 cases with 47 deaths. As the strength of the European garrison throughout these years has been approximately the same the corresponding ratios per 1,000 are comparable. The ratios are, for 1906, 15·6 and 3·19; for 1907, 13·1 and 2·77; for 1908, 14·5 and 2·76; for 1909, 8·9 and 1·58; for 1910, 4·6 and 0·63.

Next we need to show to what extent inoculation against enterica has increased among European troops in India during the same period. In 1906 we had 4,682 men inoculated or 66 per *mille*, in 1907 we had 10,155 or 143 per *mille;* in 1908 we had 16,009 or 225 per *mille;* in 1909 we had 43,566 or 613 per *mille;* and in 1910 we had 58,481 or 823 per *mille*. These figures represent numbers serving on the last day of the respective years. It can be affirmed that the returns under this head have increased in accuracy as years have gone by, and that those relating to 1910 are as accurate as present conditions permit. We hope to make them even more exact. One of the first steps taken by the writer on taking over the duties of Sanitary Officer at Army Headquarters was, with the concurrence of the Surgeon-General, His Majesty's Forces in India, to inaugurate a new system for taking a census of inoculated and non-inoculated men serving in that country. The census is taken quarterly, that is, on the last day of the months of March, June, September, and December, and embraces all troops whether in cantonments, on the line of march, or on manœuvres. The form of census report is so framed as to furnish the maximum of information, and from the data, so rendered available, the follow-

ing statistical study has been prepared, coupled with the information, as to actual cases of enterica which have occurred, available from the medical *Transactions* rendered from all garrisons for 1910.*

The coefficients of correlation, or r, between inoculation and freedom from attack, and between attack and recovery, have been calculated by the "four-fold table" method of Karl Pearson,[1] using Everitt's[2] table of tetrachoric functions, and Newton's method of approximating to the root.[3] In two cases the long method for calculating r has been employed to check the results, but in both the difference was immaterial. For the non-statistical reader it may be remarked that the coefficient of correlation measures the degree of association between characteristics; it is represented by a decimal, lying between 0 and 1. As the correlation coefficient rises to unity, we approach a condition of absolute dependence; as it falls to 0, we approach a condition of absolute independence. For some information and access to literature, the writer is indebted to Professor Karl Pearson, to whom thanks are here expressed. The probable error of r and of other values has been taken to be three times the error found by the formula $E_r = 0{\cdot}67449\ (1 - r^2)\ \sqrt{N}$.

The figures in Table I. refer to the whole of the European troops in India for the period July 1st to September 30th, 1910, and are based on the Census Return made on the last day of September, 1910. We had then serving 70,215 men; of these 2,773 had suffered, one time or another, from enteric fever, leaving a net population of 67,442 inoculated and non-inoculated men.

TABLE I.—All Troops. July 1st to September 30th, 1910.

	Inoculated	Not inoculated	
Not attacked	55,307	.. 12,029	.. 67,336
Attacked	61	.. 45	.. 106
Totals ..	55,368	.. 12,074	.. 67,442

$r = 0{\cdot}2255 \pm 0{\cdot}0073$ $\quad r/E_r = 30{\cdot}89$

* Note.—At the time of writing the official figures for 1910 are not available. The cases of enteric analysed in the text have been extracted from the schedules contained in the *Transactions* from the various hospitals.

[1] Pearson: "On the Correlation of Characters not Quantitatively Measurable." *Phil. Trans. Royal Society of London*, Series A, vol. 195, pp. 1 to 47.

[2] Everitt: "Tables of Tetrachoric Functions." *Biometrika*, vol. vii., No. 4, November, 1910.

[3] Newton: See Elderton's "Frequency Curves and Correlation," p. 128.

The figures in Table II. cover the same period, or third quarter, of 1910, are based on the same Census Return, but refer only to the Infantry then serving in India. Their total number was 49,076, of which 1,637 had suffered from enteric fever, leaving a net population of non-naturally protected men of 47,439. The infantry constitute the major part of troops, and it is, therefore, not surprising to find that the value of r in their case agrees closely with the coefficient as worked out for troops of all arms for the same period.

TABLE II. –INFANTRY. JULY 1ST TO SEPTEMBER 30TH, 1910.

	Inoculated	Not inoculated	
Not attacked	40,668 ..	6,714 ..	47,382
Attacked	36 ..	21 ..	57
Totals ..	40,704 ..	6,735 ..	47,439

$r = 0{\cdot}2275 \pm 0{\cdot}0088$ $\quad r/E_r = 25{\cdot}85$

In the same manner the correlation coefficient has been worked out for other branches. Both the total numbers and the cases of enterica in the Engineers, Staff, and Departments, and attached troops, are so small as to render any details of these groups unnecessary. It is, however, otherwise with the Cavalry and various branches of the Artillery and the Ammunition Columns. Table III. refers to the Cavalry, and Table IV. refers to all units of the Artillery and Ammunition Columns.

TABLE III.—CAVALRY. JULY 1ST TO SEPTEMBER 30TH, 1910.

	Inoculated	Not inoculated	
Not attacked	4,168 ..	851 ..	5,019
Attacked	7 ..	4 ..	11
Totals ..	4,175 ..	855 ..	5,030

$r = 0.2655 \pm 0{\cdot}0265$ $\quad r/E_r = 10{\cdot}18$

TABLE IV.—ARTILLERY. JULY 1ST TO SEPTEMBER 30TH, 1910.

	Inoculated	Not inoculated	
Not attacked	9,765 ..	3,431 ..	13,196
Attacked	14 ..	18 ..	32
Totals ..	9,779 ..	3,449 ..	13,228

$r = 0{\cdot}3137 \pm 0{\cdot}0157$ $\quad r/E_r = 19{\cdot}98$

We may next consider the facts in respect of the same groups for the fourth quarter of 1910. The data are based on the Census Returns made on the last day of the year. The facts are contained in Tables V., VI., VII., and VIII.

TABLE V.—All Troops. October 1st to December 31st, 1910.

	Inoculated	Not Inoculated	
Not attacked	58,447 ..	10,927 ..	69,374
Attacked	34 ..	22 ..	56
Totals ..	58,481 ..	10,949 ..	69,430

$r = 0{\cdot}2113 \pm 0{\cdot}0073$ $r/E_r = 28{\cdot}95$

TABLE VI.—Infantry. October 1st to December 31st, 1910.

	Inoculated	Not Inoculated	
Not attacked	41,938 ..	6,310 ..	48,248
Attacked	27 ..	12 ..	39
Totals ..	41,965 ..	6,322 ..	48,287

$r = 0{\cdot}2008 \pm 0{\cdot}0088$ $r/E_r = 22{\cdot}82$

TABLE VII.—Cavalry. October 1st to December 31st, 1910.

	Inoculated	Not Inoculated	
Not attacked	4,467 ..	760 ..	5,227
Attacked	3 ..	4 ..	7
Totals ..	4,470 ..	764 ..	5,234

$r = 0{\cdot}2245 \pm 0{\cdot}0265$ $r/E_r = 8{\cdot}47$

Table VIII. differs from the corresponding Table IV., relating to the third quarter, in that the Royal Horse Artillery are not included. They had no cases of enterica in either the inoculated or non-inoculated groups, and to have included them would have unduly affected the value of r.

TABLE VIII.—Artillery. October 1st to December 31st, 1910.

	Inoculated	Not inoculated	
Not attacked	8,600 ..	2,942 ..	11,542
Attacked	3 ..	3 ..	6
Totals ..	8,603 ..	2,945 ..	11,548

$r = 0{\cdot}2178 \pm 0{\cdot}0179$ $r/E_r = 12{\cdot}16$

It may occur to some that these figures are weakened by covering only short periods. We do not think that a serious defect, inasmuch as the facts regarding the protected or not protected condition of the population over a short period, like three months, are likely to be more accurate than if we take a given census and apply it to a longer period. To those familiar with the fluctuating nature of a military population, the disturbing effect of men going away for discharge on expiration of service, and of large drafts joining for a tour of Indian service, will be manifest. A more serious criticism of some of the Tables rests on the circumstance that the number of non-inoculated is small compared with the total, and therefore the probable error of the class group—not

inoculated and attacked is large. In some cases, too, the actual number of attacked, whether inoculated or not, is small. Table IX. shows the details for the last half year of 1910, taking the Census Return made on December 31 as the basis of the calculation.

TABLE IX.—All Troops. July 1st to December 31st, 1910.

	Inoculated	Not inoculated	
Not attacked	58,386	10,882	69,268
Attacked	95	67	162
Totals ..	58,481	10,949	69,430

$r = 0{\cdot}2596 \pm 0{\cdot}0071$ $\quad r/E_r = 36{\cdot}25$

The next two Tables, namely, X. and XI., explain themselves. They embrace all troops for the whole year of 1910. The only difference between them is that one is based on the census made at the end of the year, and the other on the census made in the middle of the year. This is introduced, as the latter census gives perhaps a fairer estimate of the protected and not protected population, it being the mid-year population.

TABLE X.—All Troops. Whole Year, 1910.
Census of December 31st, 1910.

	Inoculated	Not Inoculated	
Not attacked	58,286	10,794	69,080
Attacked	195	155	350
Totals ..	58,481	10,949	69,430

$r = 0{\cdot}3019 \pm 0{\cdot}0076$ $\quad r/E_r = 39{\cdot}61$

TABLE XI.—All Troops. Whole Year, 1910.
Census of June 30th, 1910.

	Inoculated	Not Inoculated	
Not attacked	55,926	12,493	68,419
Attacked	195	155	350
Totals ..	56,121	12,648	68,769

$r = 0{\cdot}3239 \pm 0{\cdot}0069$ $\quad r/E_r = 46{\cdot}94$

We are now in a position to affirm the existence or not of any degree of correlation between inoculation and freedom from attack by enterica. All the results are positive, and the mean value of r as given by Tables I. to XI. is $0{\cdot}2486 \pm 0{\cdot}0091$. Further, the mean weighted with N is $0{\cdot}2815 \pm 0{\cdot}0088$, and when weighted with r/E_r is $0{\cdot}3151 \pm 0{\cdot}0086$. Regarded in this way, the results are good and warrant the view that there is a very definite correlation between inoculation and freedom from attack. We confess to have expected it to be larger, but we believe the real clue to this lower value of r lies in the fact that included in the attacked group are a number of cases of paratyphoid infection. We are now but

at the threshold of a right understanding of the paratyphoids. and of exact information as to their frequency. Paratyphoid infection is far more prevalent in India than many suppose. The writer inclines to the belief, that when greater use is made of laboratory methods for the diagnosis of the pyrexias, at least one-third of the cases classed under enterica will be found to be really infection by the bacillus known as *paratyphosus* A. Under our existing rules no case is diagnosed or returned as being one of the paratyphoid infections unless the causative micro-organism has been recovered from the case. Of the 350 cases of enterica referred to in the foregoing tables and traceable in the various medical *Transactions* of station hospitals for 1910, throughout India, we have definite information that forty-four were cases of infection by the bacillus *paratyphosus* A. Of these, forty occurred in men inoculated against enterica and four in non-inoculated men. If we make the necessary correction and eliminate these forty-four paratyphoids, we get the following statement.

TABLE XII.—All Troops. Whole Year, 1910. (Paratyphoids omitted.)

Census of December 31st, 1910.

	Inoculated	Not inoculated	
Not attacked	58,326 ..	10,798 ..	69,124
Attacked	155 ..	151 ..	306
Totals ..	58,481 ..	10,949 ..	69,430

$r = 0{\cdot}2948 \pm 0{\cdot}0069$ $\quad r/E_r = 42{\cdot}63$

Of the recognised paratyphoid cases, none died. It must be admitted that there is no *a priori* reason to assume that an emulsion prepared from enteric bacilli would confer immunity against infection by either of the paratyphoid varieties. Therefore, in a country or place where the ratio of para- to the classic enteric infections is high we must expect to find that the coefficient of correlation between inoculation and freedom from attack is correspondingly lowered. We have seen that the value of the coefficient under existing conditions of knowledge is definitely positive to the efficacy of the procedure; when we know more as to the precise ratio of incidence of the para- to the true typhoid infections we anticipate that the coefficient of correlation will be still higher.

The next, or Table XIII., is a correlation table showing the relation between inoculation and recovery from attack. As might be expected, the value of r is high and that of r/E_r suggestive.

TABLE XIII.—All Troops. Whole Year, 1910.

	Inoculated	Not Inoculated	
Recoveries	173	.. 130 ..	303
Deaths	22	.. 25 ..	47
Totals ..	195	.. 155 ..	350

$r = 0{\cdot}7615 \pm 0{\cdot}0451$ $r/E_r = 16{\cdot}87$

As a further development of the inquiry as to how far inoculation has affected the prevalence of enterica in India, two frequency curves have been calculated, to see whether any change has occurred in the period of Indian service incidence. In 1910, of the 350 cases referred to in the various hospital Transactions, we find that 48 were attacked within six months of arriving in India, 53 within eighteen months, 66 within thirty months, 69 within forty-two months, 63 within fifty-four months, 25 within sixty-six months, 11 within seventy-eight months, and 10 within ninety months, and 5 at varying periods later. The year 1910 may be taken as representing a period of maximum protection by inoculation. For purposes of comparison, the year 1906 was taken. It is a year sufficiently remote from the disturbing influences of the South African War, it is not too remote from the present time to suggest any material difference in conditions of service, and is, further, reasonably typical of the pre-inoculation era, as the number of inoculated men then serving was but 6 per cent.

Of the 1,095 cases of enterica which occurred in 1906, we find that 189 were attacked within six months of their arrival in India, 505 within eighteen months, 206 within thirty months, 74 within forty-two months, 63 within fifty-four months, 29 within sixty-six months, 21 within seventy-eight months, 6 within ninety months, and 2 at later periods of residence. In both years, the cases occurring at the seven and a-half years of Indian service have been grouped with those occurring at times later than 7·5 years. These latter are so few in number as not to affect seriously the final result.

The customary method of moments has been followed, using Hardy's summation method, and the curves fitted as indicated by the value of κ for each distribution. Some doubt existed as to the type for the 1910 curve; β_2 being over 3, it was a question whether Type VII. or the normal curve of error would not be the best to use, but as the probable error of κ was large it was decided to avoid the use of a transition type, and employ the formulæ for Type I. Table XIV. shows the principal constants for the curves, while Table XV. gives the calculated ordinates.

TABLE XIV.

Curve	Type	Mean	Mode	β_1'	β_2	κ	μ_1	μ_2	a_1	a_2
1906	I.	2·07	0·7066	0·8761	1·5155	− 0·231	0·6464	0·9697	1·9974	2·9964
1910	I.	3·04	2·7814	0·4518	5·4916	− 0·108	0·9787	3·5913	1·0998	7·3566

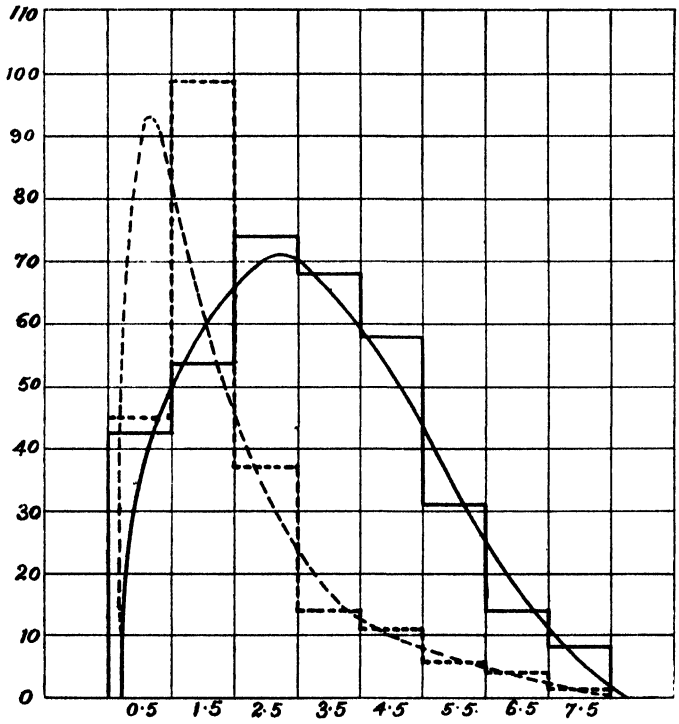
TABLE XV.

1906	225·92	497·47	185·72	71·68	55·75	29·51	20·87	8·08
1910	42·95	54·32	73·88	67·67	57·93	31·27	13·88	8·10

The equations to the curves were :

$$1906 \quad .. \quad y = 464{\cdot}68\left\{1 + \frac{x}{1{\cdot}9974}\right\}^{0{\cdot}6464}\left\{1 - \frac{x}{2{\cdot}9964}\right\}^{0{\cdot}9697}$$

$$1910 \quad .. \quad y = 71{\cdot}21\left\{1 + \frac{x}{1{\cdot}0998}\right\}^{0{\cdot}9787}\left\{1 - \frac{x}{7{\cdot}3566}\right\}^{3{\cdot}5913}$$



Dotted curve is that for 1906, reduced to one fifth.

Plain curve is that for 1910, not reduced.

The accompanying graph shows the two frequency polygons plotted. The curves are a fairly good fit, the value of P, or measure of agreement between theory and experiment, being in one case 0·4817 and in the other 0·4729. It is not claimed that the curves are free from certain inaccuracies. Such have been unavoidable, as the writer has been handicapped by want of experience and access to statistical tables and other literature which, otherwise, would have lessened materially the labour which the calculations have entailed. In spite of these defects, the curves may be accepted as affording an interesting sidelight on the question under review. The standard deviation of the 1906 curve is 1·984, and that of the 1910 is 1·516, while the respective degrees of skewness are 0·6888 and 0·8714.

To render the 1906 curve of manageable size, and to permit of tracing on the same figure as that for 1910, the calculated ordinates of the former curve have been reduced to one-fifth. The graph suggests one inference : it is that there has been in the last year a very definite postponement of the maximum incidence of enterica among European troops in India to a period of Indian service roughly eighteen months later than that in which the maximum intensity was felt formerly. Both the mean and the mode of the 1906 distribution are markedly antecedent to the corresponding constants of the 1910 curve. We are not justified in drawing any dogmatic conclusion from this single year's curve, but the fact is at least suggestive and merits noting for future years. Further, we are not prepared to say that the change is due to inoculation only, but it is difficult to avoid the conclusion, that the recent increase in the practice of inoculation has made an impression upon the period of Indian service, at and during which the European soldier has been most liable to acquire the enteric infection. The question is, to some extent, rendered clearer when we realise that 29 per cent of the inoculated population have been inoculated one year, 53 per cent two years, 11 per cent three years, 5 per cent four years, and 2 per cent more than four years ago; further, if we note that of the 195 inoculated men who have been referred to in this statistical study, as having suffered from enterica, forty-nine or 25 per cent had been inoculated one year, ninety or 46 per cent two years, thirty-four or 17 per cent three years, nineteen or 9 per cent four years, and the remainder or 3 per cent more than four years ago. Putting these facts in another way, it can be said that the liability to enteric infection by the one-year inoculated group is 0·861, of the two-year group 0·868, of the three-year group 1·54,

of the four-year group 1·80, and of the over four-year group 1·50. If any deduction is permissible from these figures, it is that there is a definite inhibitory force at work among the inoculated population during the first thirty months, but that this inhibitory force is weakening between the second and third years after the operation. Theoretically, there is much to support this inference from the statistical data.

If other evidence be needed of the change which has come over the degree of enteric incidence among new arrivals in India, attention may be directed to Table XVI. It gives the various units which arrived in India in the respective trooping seasons of 1905-6 and 1909-10, together with the number of cases of enterica occurring in each within the years 1906 and 1910; it also shows the extent to which each unit was protected by inoculation during those periods. It is not a table compiled by modern statistical methods, but merely an old-fashioned way of stating the case; perhaps it may be, for that reason, none the less interesting.

TABLE XVI.

1905-6	Arrival in India	From	Percentage of inoculated	Cases of enterica in 1906
17th Lancers	24.10.05	England	34	27
"N" Royal Horse Artillery ..	9.2.06	S. Africa	*Nil*	5
"S" ,, ,, ,, ..	,,	,,	*Nil*	4
76th ,, Field ,, ..	,,	,,	1·5	3
81st ,, ,, ,, ..	,,	,,	0·9	7
82nd ,, ,, ,, ..	,,	,,	0·9	5
1st Northumberland Fusiliers ..	17.2.06	Mauritius	14	28
2nd East Yorkshire Regiment ..	27.1.06	England	29	18
1st West Riding Regiment ..	12.11.05	,,	21	19
2nd Rifle Brigade	5.12.05	Egypt	15	15
1909-10				Cases of enterica in 1910
8th Hussars	19.10.09	England	98	13[1]
"X" Royal Horse Artillery ..	9.12.09	S. Africa	71	5
"Y" ,, ,, ,, ..	,,	,,	62	*Nil*
10th ,, Field ,, ..	,,	,,	79	1
26th ,, ,, ,, ..	,,	,,	79	1
92nd ,, ,, ,, ..	,,	,,	65	*Nil*
2nd Cameron Highlanders ..	2.11.09	China	80	2
2nd North Lancashire Regiment	9.12.09	Mauritius	100	7
4th King's Royal Rifle Corps ..	21.12.09	England	98	*Nil*
1st Dublin Fusiliers	3.1.10	Egypt	91	3

[1] 10 of these were *paratyphoid* A.

To draw general conclusions from this single table would be fallacious, as it makes no allowance for location of individual units

or special and local conditions, either favourable or antagonistic to infection. Still, even crude as it is, it is difficult to ignore the differences between the experiences of similar units, of comparable strengths, arriving from similar places at corresponding seasons in India. The one group has, roughly, but a fourth of the enteric incidence of the other.

The conclusions we draw from the facts which have been given in this article are definite. They amount to this: that the case for anti-enteric inoculation is a strong one, whether we consider it from the point of view of freedom from attack, or of recovery after attack. The coefficient of correlation is definitely positive as to the first proposition, and even more so as to the second. In inoculation we have a valuable asset for both the prevention and control of enteric fever among European troops serving in India. It is not our sole asset, neither is it the one and only cause of the notable reduction of enterica in India. It is necessary for us to keep the facts in proper perspective. Concurrent with the increased number of men serving who have been inoculated, we have had the development of preventive measures on other lines, notably the routine segregation of all drafts and new arrivals, the establishment of the two enteric convalescent depots at Naini Tal and Wellington, to one or other of which every case goes before return to barracks and duty. These depôts have reduced to a minimum the possibility of "carrier" cases returning to their units, and so spreading infection. Since the depôts were opened in 1909, thirty-one carriers have been detected; had these thirty-one men not been detected, the aftermath of enterica, resulting from their casual return to their units, under the pre-depôt system would have been appreciable. Further, we have had within the last two years the inauguration of a wet system of latrine management, and better conservancy methods, combined with an undoubted greater attention to sanitary precepts on the part of officers and men. Each and all of these procedures have their value, and have contributed to our present state of lessened enteric prevalence. If we are to maintain the ground so gained, we need to be even more strenuous in our efforts on the lines which so far have been successful. There must be no slackening or mere marking time. We have an enormous front exposed to attack, and our means of defence require constant attention and strengthening. Personally, the writer anticipates a reaction, that is, he fears the effect or outcome of a false sense of security. We must be careful to guard against this. There are not wanting

signs that 1911 will not show so fine a record as 1910. As more use is made of laboratory methods in the diagnosis of the pyrexias, the more cases of paratyphoid infection we expect to find. As regards true enteric fever, the danger lies in the fact that our artifically protected population is, by lapse of time, becoming less protected. The remedy appears to be the adoption of steady and persistent *re-inoculation of all men who have been inoculated more than thirty months.* We urge the adoption of this policy at once.[1] It means trouble and the combating of prejudice and supineness, but the result can but be of the best, and the placing of a keystone on an arch which, step by step, has been built up laboriously and in the face of much opposition.

Possibly this attempt to review the campaign against enterica from a statistical standpoint may not appeal to, nor even be read, by the non-technical person, but, into whatever hands it may fall, it cannot be too emphatically stated that at no time in the history of our own army, nor in that of any other army, has there been a finer or more brilliant achievement in the reduction of sickness, inefficiency, and death from the scourge of armies than can be read between the lines of the prosaic figures which it has been necessary to furnish in the foregoing pages. Initiated by Sir Almroth Wright, inoculation has been steadily developed and pressed, concurrent with other measures, by officers of all ranks in the Royal Army Medical Corps. The result is that for 1910 the admission-rate and death-rate from enterica among European troops in India stands at 4·6 and 0·63 per *mille.* To him and to them be the credit. *Prosit!*

[1] The Principal Medical Officer of India has issued instructions for action to be taken on these lines.

INCINERATION IN THE FIELD.

By Captain P. S. LELEAN.
Royal Army Medical Corps.

(*Continued from p.* 524.)

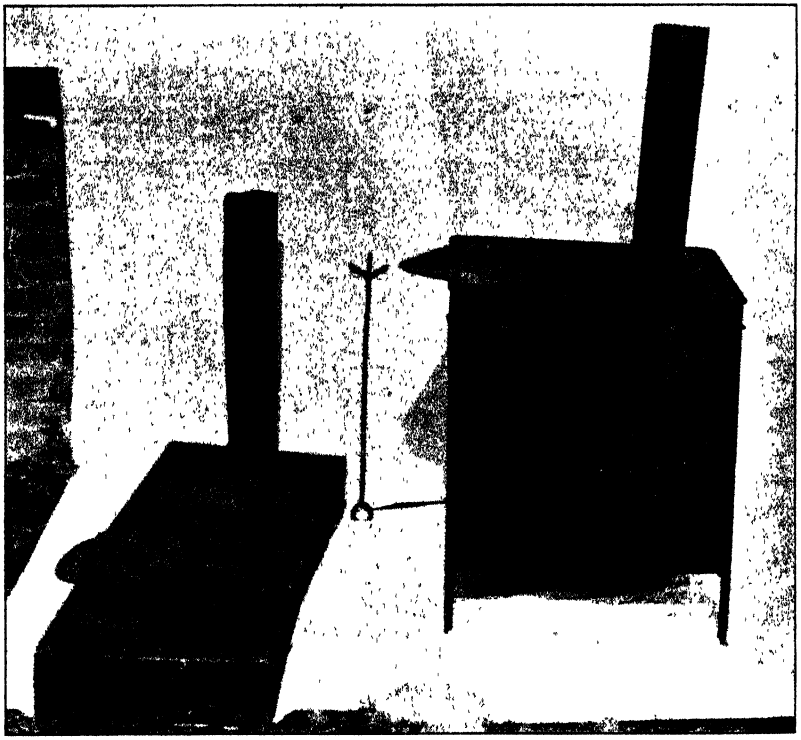
The importance of sound sanitation in the field is amply evidenced by the amount of sickness among troops on active service and the influence of preventable diseases on the course and cost of recent campaigns. That influence may be summarised in the estimate that, for every man killed by the enemy during our wars of the last thirty years, disease has caused no less than forty hospital admissions and 4·8 deaths. Further, the scope of this influence is narrowed down by the fact that this marked disparity is mainly due to prevalence of preventable disease of one type—the intestinal. For example, enteric and dysentery together accounted for 42 per cent. of the total deaths during the South African War, which cost us over 8,000 lives from enteric alone.

Such facts as these make a review of our field sanitary methods of the utmost importance, especially as regards the disposal of human dejecta containing the specific organisms of these preventable intestinal diseases. It is obvious that the best method of disposal is that which ensures the speediest destruction of infected material while affording the least exposure to access of flies meanwhile. The former requirement is certainly met by incineration, which can be made to meet the latter also. Its practicability must be discussed from the standpoints of type, fuel, and transport; while its military desirability must depend upon the ratio between its efficiency in reducing disease and its relative cost. As these factors possess different values in times of peace and war, these conditions need separate consideration, but repetition will be avoided by dealing first with the minimum needs for war and then the additions which may be made for the less exacting conditions of field service in peace time.

Active Service.

Delay in experimenting with incinerators for use in war has apparently been largely due to a preconceived idea that the fuel difficulty was almost insuperable, and that the transport required precluded the use of portable types of incinerator. The summation of these inhibitory beliefs unfortunately prevented experiments which would have led to the evolution of closed types, while crude

trials with mud structures led to prejudice against the method. These mud structures were not only slow to get working, but they had the defects inherent in all open types—offence, fuel extravagance, and danger of dissemination of the contents by wind. Trials of these crude patterns confirmed the belief that the fuel difficulty was considerable, and so prevented trials with better types which would have modified that belief. The essentials for a field service incinerator are: (1) It must be of a closed type, ensuring rapid,



Type (*b*) Type (*a*)

FIG. 1.—After a month's use in the field.

economical combustion; (2) strength to survive an average Indian campaign—of three months; (3) lightness for convenient human and animal transport; (4) cheapness that permits of "scrapping" without economic scruples when its work is done.

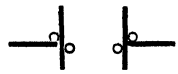
Types.—Two types have been produced which fulfil these conditions. They are illustrated by photographs submitted, while full

specifications are embodied in an appendix. It is sufficient here to give a general idea of their form thus :—

Type (*a*) forms a 2-ft. cube on four short legs. The sides are of sheet-iron, the base a grid; the cover is of sheet-iron, with a swivel-lidded feed-hole and a hole for a 2-ft. high chimney.

Type (*b*) consists of grid and cover. The grid is laid in a trench which is covered by two sheet-iron shells, placed end-to-end to form a roof and shallow sides. Each roof section has a swivel-lidded feed-hole, and one has also a hole for a 2-ft. high chimney.

The only detail calling for comment is that of the chimney. It consists of a tin sheet, lying flat for packing, and two iron rings. For use the sheet is folded in pipe form around the smaller of the rings and fixed by slipping the larger ring over one end for three inches. This end is fitted into the hole in the roof so that the outer ring rests on the margin of the hole, thus preventing the chimney from slipping down or being blown aslant. The following diagram shows a vertical section of the chimney in position.



Pans are made of block tin, 18 in. by 9 in. by 2 in., the sides being sloped to permit of nesting for transport.

These suggestions represent the minimal requirements for incineration on active service. The weights and costs are :—

	Weight in lb.	Cost in Rupees.
Type (*a*)	42 ..	5 0
Type (*b*)	35 ..	4 0
Pan	1 ..	0 8

It is evident that the desiderata of soundness of pattern, lightness and cheapness have been attained. The question of durability remains to be proved, but it is noted that the photographs attached were taken on the return of these types from a field trial of a month, which included a week on the line of march. Examination of the results of that trial indicate that the estimate of three months' life will probably be exceeded. Greater strength could readily be secured by increasing the weight, but the object has been to keep that weight down to the 40 lb. which forms one coolie-load. Considerable trouble has been taken to secure that distribution of weight which would give the maximum strength of the whole and the result appears to repay the trouble thus expended.

Fuel.—The field trial referred to has shown that under favourable conditions two such incinerators—one of each type—can dispose of

the fæces and urine passed during defæcation by 900 men. Both of these were reduced to ash in four hours on a daily expenditure of the litter of 236 animals plus line sweepings and kitchen grass grease-traps.

Certain minor details are dealt with under "Details of Working" —it is sufficient here to state broadly that this trial indicates that field incineration is possible with these types in dry weather, when the ratio of animals to men reaches 250 to 1,000, provided that the animals are not bovines, and that they are supplied with the war-scale ration of hay. If this estimate be applied to a study of active service strengths, it is evident that the worst circumstanced field unit needs little, if any, fuel in addition to that provided by its own animals, while mounted units and mixed forces need extra incinerators to deal with excess of litter.

The official active service strengths, without tents, are :—

Unit	Men	Animals	Ratio of animals per 1,000 men
B.I. Battalion	1,033 ..	263 ..	254
N.I. Battalion	916 ..	227 ..	248
B.C. Regiment	700 ..	770 ..	1,100
R.F.A. Battery	246 ..	223 ..	906
B. Mountain Battery	366 ..	265 ..	721

The worst circumstanced field units are the infantry battalions, and they have approximately 250 animals per 1,000 strength of men.

The problem may be approached from another standpoint as a control of the results obtained by practical trial.

(1) Extended observations have been made of the working of a closed pattern incinerator. The daily fuel (stable litter) used during one wet and two dry months was weighed and worked out thus for destruction of the fæces and urine passed during defæcation by 1,000 men, plus evaporation of some additional urine : —

Month	lb. fuel	Gallons extra urine evaporated
September	1,664 ..	122
October	1,556 ..	169
November	1,436 ..	158

The extra urine evaporated should not be taken into consideration as the trial was made with a fixed incinerator, which naturally gives better results than the field pattern. We therefore find the result to be that 1,600 lb. of litter suffices for the destruction of the fæces and urine passed during defæcation by 1,000 men.

(2) The average droppings per twenty-four hours were dried and weighed; the results are shown in the following table :—

Animal	War scale ration in lb. Grain	Hay	Droppings in lb.
R.H.A. Horse	15	20	.. 16
B.C. Horse	10	20	.. 13
N.C. Horse	8	20	.. 12
Mule	6	15	.. 10

Omitting the heavy draught horse, there should be 12 lb. of dried droppings per animal from a mixed force. Accepting half this amount as a low estimate, there should be available for incineration on active service 6 lb. per animal.

(3) Of the hay ration the proportion not eaten is variously estimated as from 10 to 20 per cent. The former is the minimum, while the latter is what remains unconsumed when the animals are out for the greater part of the day—thus making automatic provision for extra fuel when extra speed of incineration is needed. Two pounds per animal may, therefore, be considered available from a mixed force.

(4) Bedding grass is also provided "when procurable" at the rate of 6 lb. per horse. As however this is uncertain, it is omitted from the calculation.

It is thus calculated that in twenty-four hours at least 8 lb. of mixed litter per animal should be available. The 1,600 lb. shown to be needed for 1,000 men is thus afforded by 200 animals. This figure is in approximate agreement with that obtained experimentally—the 18 per cent. difference being attributable to lack of drying facilities, the litter used in the trial having been saturated by dew.

The conclusion reached at this stage is that even infantry battalions should be able to dispose of fæces and urine passed during defæcation by incinerating with their own fuel, and that mounted and mixed forces will have an excess of litter to dispose of. As it attracts flies and affords them breeding grounds, this litter should be destroyed. If the minimal two incinerators were doubled, this would not only be possible, but the ashing of excreta could be effected in two hours, and camps be cleaned up the more rapidly after the troops had marched out.

As regards the residue of urine, it must be worked out what this residue would be if excess fuel were utilized. What remained could be trenched with little labour, flies being kept away by lining the trenches with grass (to be afterwards burnt) and sprinkling with kerosene.

One point remains to be considered: it is that of the applicability of these data to the incineration of the dejecta of native troops



Type (*a*) Type (*b*)

FIG. 2.



FIG. 3.

who contribute no paper, may contribute washing water, and who pass 9 oz. of fæces per diem, as against 5 oz. per head per day passed by Europeans. A large number of natives is associated with an increased number of animals, save in the case of infantry units and brigades. In the latter case additional requirements could be supplied by supply and ammunition columns, while in the former the little extra fuel which may be needed would usually be available close at hand.

Transport.—The types described pack up thus:—

Type (*a*).—The sides and supports are united by rings so that they fold together Z-fashion, quite flat. Grid, roof, and chimney fit flat also, and the chimney rings are held in the shallow hollow of the roof by apposition of other parts. The whole measures $2\frac{1}{4}$ by 2 by $\frac{1}{2}$ ft., and weighs 42 lb.

Type (*b*).—Grids, chimney, and rings fit into the narrower of the two roof shells, over which the broader shell fits to form a box, which has spare capacity for holding also six pans. The dimensions are $2\frac{1}{4}$ by $1\frac{1}{2}$ by $\frac{1}{2}$ ft., and the weight is 35 lb.

Each type thus forms one-quarter mule load, one-third donkey load, or one coolie load, and is equally adapted for each form of transport. Sweepers are provided at the rate of eight per regiment, and could carry four incinerators and fifty pans if each took 27 lb. against the usual coolie load of 40 lb.

Pans.—Weigh 1 lb. each and occupy $\frac{1}{2}$ inch of depth if nested and packed in bags with purse-string mouths.

To prevent battering out of shape, it is better to have them carried by the sweepers, but they can equally well be carried hung from saddle hooks. They are provided at the regulation rate of 5 per cent. total strength.

The mechanical part of the transport problem is thus easy of solution; caste prejudices of drivers present difficulties. The enlisted drivers are prohibited by caste from contact with human excreta—they will not handle the apparatus, drive mules carrying it, nor subsequently touch the contaminated equipment. Although these caste prejudices have on occasion been overcome, it would not be politic to enter on a campaign with so necessary a body of men harbouring a sense of grievance. Moreover, the use of mules would either involve having two mules for each mule load, or else it would be impossibile to send part of the plant with the advance party. It is therefore better to have two donkeys per 1,000 strength, one of which goes on with the advance party, while the other remains to follow with the rearguard when the camp has been cleaned and incineration is completed. These donkeys should

be able to cover three miles an hour with only two-thirds of their full load to carry. The initial cost of a mule and a donkey being respectively Rs.175 and Rs.15, the cost would be Rs.145 less for two donkeys than for one mule. The whole care of the donkeys could be taken over by the jamadar sweeper, who should be paid Rs.2 per month extra for this duty. If it were clearly laid down that loss of the animals would involve carriage of all the plant by the sweepers, it is safe to predict that in very few instances would this means of transport break down.

Cost.—This is estimated per unit of 1,000 strength, four incinerators, fifty pans, and two donkeys being provided, and the campaign estimated to last for three months.

(*a*) Initial outlay	Rs.	(*b*) Current expenses	Per mensem Rs.
4 incinerators	18	Donkeys' food	16
50 pans	25	Jamadar's extra pay	2
8 pan-bags	4	Kerosene—one tin..	2½
2 donkeys	30	Matches—4 dozen..	½
3 sunkhas (pads)	4		
Rope	5		
	83		
Less sale of donkeys, half-price ..	15		
For campaign	71		
Per mensem	24		21

Total Rs. 45 per mensem.

This allows for striking off charge the whole equipment at the end of the campaign, although probably the depreciation would not exceed 50 per cent. of the value. Even ignoring that asset, and adding 10 per cent. for unforeseen incidentals, the monthly cost of incineration for 1,000 men in the field is only Rs.50, *i.e.*, 0·8 of an anna per head per month. A cost of less than one anna a head a month is not a heavy price to pay for a trial which would relieve the troops of much irksome fatigue work, and holds out a reasonable prospect of reducing the incidence of those infective intestinal diseases which are so potent a factor in the production of high rates of sickness during active service.

Details of Working.—There are a number of minor points upon which information is needed, to be dealt with under this heading. Many of them were suggested by the trials referred to, and quotation marks indicate the opinions of Major A. W. Bewley, R.A.M.C., who controlled those trials, and to whom I take this opportunity of expressing my indebtedness.

Fuel.—There must be a matrix which will entangle the excreta while they dry and are being destroyed. Bhoosa (chopped straw) alone will not serve, as it falls through the fire-bars; although the latter are only ¾-in. apart. Bhoosa being an alternative ration, of the same weight and cost as hay, there should be no difficulty in ensuring that a proportion of hay should always be issued on active service. A layer of litter in the pans absorbs dejecta, so that the whole pan contents can be emptied, and the pan, with few exceptions, is left quite clean.

Stoking.—Pans were emptied into the incinerator immediately after use. Occasional loosening of the furnace contents with a rake was all that was required. Very little fæcal matter fell through the bars, and this was absorbed by the ash, so that it could be easily returned to the furnace. If banked up well, the fires burned all night. "If fine, addition of a small quantity of fresh fuel in the morning produced a very effective fire."

Storage.—None was required for dejecta, even if 80 per cent. of the men used the latrine before leaving camp in the morning.

Time taken to Ash Dejecta.—This was found to be four hours. With ample fuel and three incinerators the period required to sterilise all dejecta was reduced to two hours.

Offence.—"At no time was any fæcal smell detectable at, or near, the incinerator, and the smoke—save when first kindled, or when the fuel was wet—was very slight."

Effect of Moisture (1).—Rain. A fall of 1½ in. in one night put out both types, and made it difficult to re-start type (*b*) owing to water lying in the trench. This suggested that a cowl should be added to the chimneys. A plain tin sheet 10 in. by 7 in., with two slots in the 7-in. edge, would lie flat for packing, and if bent over, so that the upper edge of the chimney fitted into the slots, would not only keep rain out, but would aid combustion by aspiration if the convexity were turned towards the wind. If rain threatened, the type (*b*) could be placed in a thrown-up mound, instead of the trench being sunk below ground-level. This would also aid combustion, if the open end of the trench were directed towards the wind.

(2) Dew. Excessively heavy dew saturated the night litter, and caused difficulty if a rush of work came in the morning. This could be met if four incinerators were provided, by filling one or two of the types (*a*) with litter overnight, and reducing combustion by plugging the chimney with a roll of grass. A supply of dry litter would thus be available in the morning.

Flies.—"It is remarkable that no flies were found in, or near, the latrines, although they were plentiful in all other parts of the camp." N.B.—The incinerators were sited close to the latrines.

Droppings.—Bovine fæces are difficult to deal with, unless dried. This difficulty is enhanced by the fact that bullocks must be fed largely on bhoosa, which forms poor fuel.

Applicability to Active Service Conditions.

Having marshalled the facts, we are now in a position to consider the adaptability to active service conditions of incineration by these types.

The unit of calculation hitherto has been 1,000 strength, for which two incinerators of each type are proposed, with provision of two donkeys for transport. The whole work, with care of equipment and donkeys, should be undertaken by the existing war-scale establishment of sweepers, under supervision by their jamadar. It will be first considered how the work would be carried out for this standard unit, and then what modifications may be needed for units of smaller strength and different composition.

(1) *Night.*—On reaching camp with the advance party, types (*a*) are rapidly got going (actual time for putting together was one and a-half minutes) using the driest fuel sprinkled with kerosene. The fire must get a good hold of the lower layers before more fuel is put in. If a slight forced draught is wanted, it can be secured by burning a kerosened hay plug in the chimney. The pans are lined with litter, and laid out on the adjoining latrine site; if used before the fire is burning efficiently, the dejecta must be covered with ash at once, lest flies settle on them. Owing to the speed with which the furnace can be made ready, there is no need for much ash—the small amount required can be carried by the sweepers in the pan-bags. The types (*a*) can readily deal with any rush that may occur pending the arrival of types (*b*), for which trenches are being prepared meanwhile (the actual time was fifteen minutes). As soon as types (*b*) are ready to cope with the dejecta, types (*a*) are filled with litter only.

With the proviso that the fires must burn all night, types (*b*) should destroy as much, and types (*a*) as little, as possible—so that the latter may contain an ample supply of dry fuel for the morning's rush of work. The final night stoking should be adapted accordingly.

At this point the question arises whether sufficient fuel will be available soon enough after arrival in camp for the sweepers to cope

with a rush of work, such work being proportionate to the earliness of the hour at which the force marches in the morning. A mounted advance-guard would provide a certain amount of fuel, but an infantry force would experience difficulty if latrines were freely used before the transport came in. In the absence of definite data this difficulty must be met provisionally by the addition of an extra donkey per 1000 strength for carriage fuel. This animal could carry 100 lb. of dried litter in two gunny-bags, 2ft. 6 in. long by 1 ft. 3 in. diameter. The monthly cost per head would still be kept under one anna (0·92 anna); the extra fuel thus provided would deal incidentally with possible fuel shortage of infantry units.

Morning.—Types (*b*) should be stoked early with the dry fuel from the types (*a*), so that they may be working full blast when the latrines are being used. Types (*a*) continue working until dismantled; they are cooled and packed on one mule. Two sweepers take half the pans, a supply of ash, both types (*a*) on one donkey, and 100 lb. of dry fuel on the fuel-donkey (if the latter be needed), and stand ready to move off with the advance-guard. Both types (*b*) are meanwhile dealing with dejecta as passed, also with grass from urine trenches and grease-traps, the latter of which burns furiously, and litter. By the time the camp has been cleaned up, the unburnt residue should be reduced to a bulk which admits of rapid trenching beside the incinerators by the rear-guard, when it is ready to move off. It should be noted that all human dejecta will have been protected from flies; that it will by this time have been scorched, if not destroyed and that jackals do not dig it up. It should therefore be quite safe to bury what remains in the urine trenches. In the event of military necessity, there would always be time for the rear-guard to trench this residue while the main body marched out. During this trenching both types (*b*) could be dismantled, cooled rapidly by the earth thrown up and packed for transport while the trench was being filled in.

Offal might be burnt in camps occupied for some time; otherwise it should be buried, while the carcases are being dressed for issue. This is a measure which it is most difficult to get carried out in the field, and offal attracts any flies that may be in the vicinity.

Animal carcases and human corpses have also to be considered. The quantity of fuel available will seldom suffice for the destruction of the former, but it is essential that something should be done both as regards nuisance in the vicinity of camps and for protection of transport animals from such infective diseases, *e.g.*, anthrax, as may have been the cause of death. The carcases should be disem-

bowelled, and the entrails buried in a closely adjoining pit. The carcase should then be filled with kerosened grass, and grass piled over it before setting alight. A body the size of a camel needs a pint of oil and some 50 lbs. of grass. The fire chars and sterilises the exterior and sterilises the blood spilt. The boon of incineration over attempted burial of dead animals will be appreciated alike by those who have attempted burial, or suffered from non-burial, of carcases in war-time. Of the method of disposal of human corpses on stone cairns, by the aid of wood and kerosene, I have no experience. It proved successful in Japanese hands, but the weight and expense of materials used must have been a heavy price for the sentimental and hygienic interests served.

Smaller Units than One Thousand Strength.

(*a*) Cavalry regiments with 700 strength still need four incinerators, owing to excess of litter. The extra donkey costs so little that it might well be retained. As litter (droppings) will be available soon after arrival in camp, this animal might carry 70 lb. only of dry fuel and have its load made up by a fifth incinerator, of type (*a*).

(*c*) Units of 500 and less strength still need two donkeys, so that one may proceed with the advance party. As these units also have excess of fuel, it would suffice if the animal with the advanced party carried one incinerator and the other carried two incinerators. This extra incinerator would be valuable, and the minimal transport enables it to be carried.

Additional Requirements in Peace Time.

Although in normal conditions ample transport makes it unnecessary to reduce weight and bulk to such fine limits, it is obvious that, *ceteris paribus*, light and compact equipment is preferable. This is more evident as regards the lightness, and especially the compactness of such existing peace-time equipment as units would require to take for use at the base and storage there during the period of a campaign. The existing equipment of a B.I. battalion was found to consist of the following, per 1,000 strength :—

	lb
10 wooden seats, each 10 by 1¼ by ¼ ft. and weighing 45 lb.	450
10 screens, with poles and kannats, forming rolls 6 by 1¼ ft.	300
2 Samway incinerators, forming 4 packages, each 4 by 3 ft.	204
50 latrine pans	50
Total	1,004

If "bullies" (scaffold poles) were used for all—as for some companies—this weight would be increased to 1,234 lb. for the unit.

So weighty and bulky a mass can be carried on a country cart along some sort of a road, but it is ill-adapted for, or impossible of, transport if only animals be available. It would occupy considerable space when carried by rail or stored at the base.

Screens are essential and seats desirable; the following suggestions combine minimal weight and bulk with most moderate cost :—

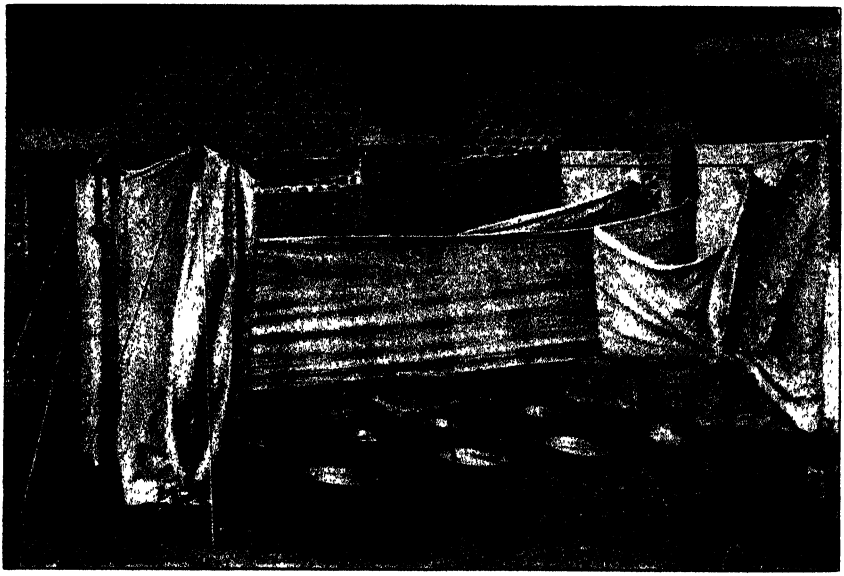


FIG. 4.—Seats, pans and screens *in situ*, for a double company. Note the front of one screen has been drawn aside; the sweeper's alley passes between the two screens placed back-to-back.

Screens.—Details and specifications are given in the appendix. They enclose space for five seats per company, one seat being separated off for N.C.O.'s. Weight, with poles and mallet, is 17 lb.

Seats.—Consist of angle-iron, and all parts are hinged to fold into one bundle 5 ft. long by 3 in. square. The weight is 15 lb. for five seats. Specifications in appendix.

Transport.—The screen is laid flat, with poles *in situ* in vertical folds of the material; it rolls around the folded seat and mallet to form a roll 5 ft. by 1¼ ft. diameter. The whole weighs 32 lb.,

and is thus convenient for animal transport. Being in one piece, the screen can be erected and the seat put up in well under five minutes.

Cost.—The whole amounts to Rs. 10 per company.

This extra peace equipment must now be considered with that previously described as the minimum needed for war, *i.e.*, four incinerators and fifty pans per 1,000 strength. Total weights and costs would then be :—

	lb.	Rs.
10 screens, each 17 lb., at Rs.8.12	170	87½
10 seats, each 15 lb., at Rs.1.12	150	17½
50 pans, each 1 lb., at Rs.0.8	50	25
4 incinerators, averaging 38½ lb., at Rs.4.8. .. .	154	18
Totals	524	148

It is seen that this equipment is only 50 per cent. of the weight of that now in use, the transport advantages are obvious, and four incinerators are provided instead of two. This latter point enables the double company to form a detachable independent unit with one incinerator complete, its whole equipment weighing 116 lb., which is well within the 120 lb. load for a single donkey. The two screen rolls balance each other, and the grid and pans balance the remainder of the incinerator parts; the donkey would be thus well loaded, and should proceed along level country at a good pace.

When the unit moved as a whole, each donkey of the five provided would carry 105 lb. Two animals would accompany the advance party, and the other two follow with the remainder of the equipment when the camp evacuated had been cleaned up. The simplicity, divisibility, speed of erection, cheapness and lightness of this equipment is thus apparent, while its ease of transport affords overwhelming advantages over apparatus which could not be carried by animals.

In conclusion it is felt that the case in favour of incineration on field service might have been better presented. Extended trials are still required before the facts stated can be regarded as definitely established, and many details have still to be worked out. At the same time it is hoped that a demonstration by actual trials, not only of the practicability but also of the economy of this method of conservancy, may lead to extended trials elsewhere, and, in due course, to the provision of a peace equipment, which will afford this hygienic method an opportunity of proving its influence in reducing the terrible prevalence of specific intestinal diseases among our troops during war.

FIELD SERVICE INCINERATION EQUIPMENT.

Specifications, Weights and Costs.

	lb.	Rs.
(1) *Portable latrine*, provision per company at 5 per cent. seatage.		
Seat—for 5 persons at 2 linear ft. per head	15	1.12
Throughout of $\frac{3}{4}$ by $\frac{1}{4}$ by $\frac{1}{8}$ in. L-iron, legs hinged to top and top hinged to fold on itself at centre. Top, 10 ft. long; legs, 3 of $2\frac{1}{4}$ ft. long, lower ends pointed for driving into the ground 9 in., a small flange marking this limit,		
Screen—of coarse sheeting or "gunny" at 5 annas per yard ..	6	6.0
Encloses a rectangle 10 by 4 ft. and 5 feet high, the lower $1\frac{1}{2}$ ft. at back being left open. A small vertical partition shuts off one seat at the end, for N.C.O.'s. In the centre of the front wall, a 15 in.-wide doorway is covered by a flap 3 by 5 ft., attached at the upper and one of the side edges to the front wall and weighted at its lower edge by a small bamboo rod. It is supported at its upper edge all round by ropes and is made with vertical folds to contain the poles. Four bamboo rods 5 ft. by 1 in. diameter, iron-ringed above, are secured in the vertical folds of the screen	6	0.12
Ropes and tent pegs, 8 sets	4	1.8
Wooden mallet, iron-bound	1	0.8
Pans—six (one spare), of block tin, 18 by 9 by 2 in., sloped at sides to permit of nesting. When nested, each additional pan occupies $\frac{1}{2}$ in. depth	6	3.0
Totals	38	13.8

	lb.	Rs.
(2) *Portable Field Incinerators.*		
Pattern (*a*)	42	5.0
Encloses 8 cubic ft. in a 2 ft. cube.		
Uprights—4 of $\frac{3}{4}$ by $\frac{3}{4}$ by $\frac{1}{8}$ in. L-iron. Length $2\frac{1}{2}$ ft., with flanges at, and 6 in. from, the lower ends.		
Sides—4 sheets of 24 S.W.G. sheet iron, 2 ft. square. These are united to the uprights at their vertical edges by 3 rings of $\frac{3}{16}$ in. iron. These rings pass through both faces of the L-iron of the uprights and both the adjoining sides. Play permits of the sides and uprights being folded flat together, one angle being provided with split rings for this purpose.		
Grid—of $\frac{1}{4}$-in. iron bars, riveted at their ends to 2 ft. lengths of $\frac{3}{4}$ by $\frac{3}{4}$ by $\frac{1}{8}$ in. L-iron. Intervals of 1 in. between bar centres. At the centre of each side of this 2-ft.-square grid, a swivel flange is fixed, which turns up outside the sides of the cube when *in situ* and prevents them from yielding to outward pressure.		
Roof—of 24 S.W.G. sheet iron, 2 ft. square. The edges are riveted to $\frac{3}{4}$ by $\frac{3}{4}$ by $\frac{1}{8}$ in. L-iron, so that the vertical flanges of the L-iron fit inside the upper edges of the sides. A 6-in. diameter hole is left for the chimney and a feed hole of 18 by 9 in. is covered by a lid of 24 S.W.G. sheet iron working horizontally on a laterally-placed pivot.		
Chimney—A thin tin sheet 24 by 20 in. Two rings of $\frac{3}{4}$ by $\frac{1}{8}$ in. iron, one of 6 in. internal diameter and the other of 6 in. external diameter.		

Cowl—A thin tin sheet 10 by 7 in., with two slots in the 7 in. edge. The slots run parallel with the longer side and are each an inch deep and an inch from the centre of the short side. The slots are ¼ in. wide.

Rake—2 ft. of ¼-in. iron bar, cut at the end into three claws.

Pattern (*b*) 35 4 0

Encloses a space of 11 cubic ft., when placed over a 9 by 1½ ft. trench. One end of the trench is vertical, the other slopes up to ground level. The trench sides are 18 in. apart above and narrow to 12 in. apart at 6 in. from the bottom. The grids are supported by a ledge left in the sides 6 in. from the bottom of the trench.

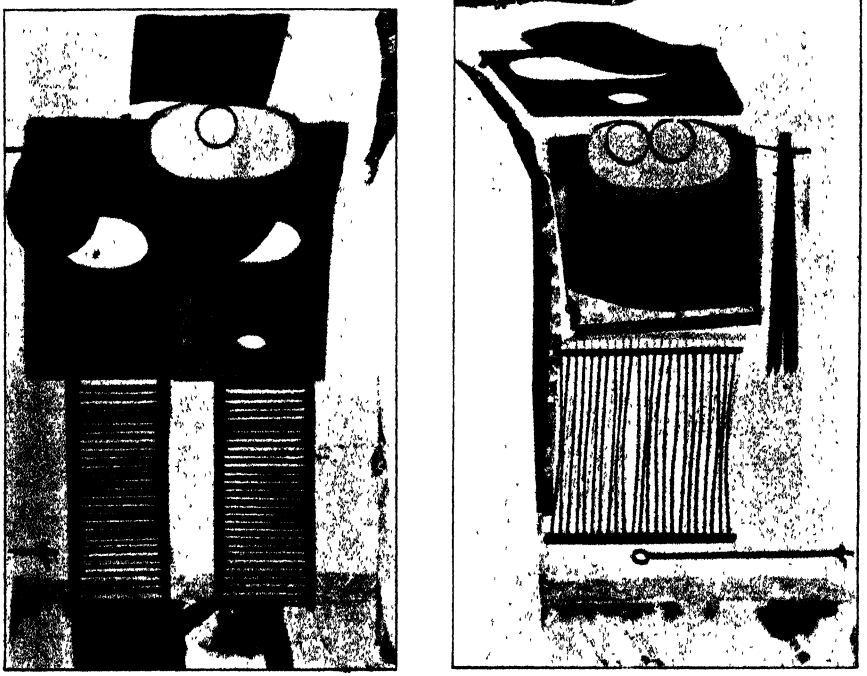
Roof—Two shells of 24 S.W.G. sheet iron; one is 4½ by 1½ ft. with 4-in. flanges at one end and both sides, the other is just narrow enough to fit inside the first to form a closed box. Each half has a feed-hole as described above, and one has also a chimney hole.

Chimney—as above.

Cowl—as above.

Rake—as above.

Grid—of two halves, each 2½ ft. by 13 in. Iron bars, 13 by ¼ in., are riveted into 2¼ ft. lengths of ¾ by ¾ by ⅛ in. L-iron at either end, with a spacing of 1 in. between bar centres.



Type (*b*) Type (*a*)

FIG. 5.—Dismantled to show parts.

THE ELIMINATION OF MALTA FEVER FROM PORT SAID.

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Late Health Officer, Port Said.

THE prevalence of Malta fever at Port Said appears to have been noted, in the first instance, by Fleet-Surgeon Bassett Smith, R.N. He mentioned the existence of prolonged fever in that town in his lectures at Haslar Hospital, 1903, and stated that he believed this fever to be identical with Malta fever. The writer of the present article described its incidence there in a paper published early in 1906.[1] The disease differed in no way from that described at Malta and elsewhere on the Mediterranean littoral. At Port Said Europeans and natives alike were attacked. The fever was of the usual prolonged and undulant type, or of the milder "latent" form described by the Malta Fever Commission. It was often accompanied or followed by the well-known complications or sequelæ—neuritis, synovitis, anæmia, and cachexia, &c. It showed an increased incidence in the hot weather, but was liable to break out in small localised epidemics in the cold months. There were Malta fever houses at Port Said as at Malta—probably those supplied by certain infected goats. Several outbreaks occurred in the Government Hospital, when both staff and patients were laid up often for months. The mortality was small. During the summer of 1905 the blood of several fever patients was found to agglutinate the *Micrococcus melitensis*, and later in that year the micrococcus itself was isolated from the bloods of some patients in the hospitals.

An attempt was made to obtain exact figures of the incidence of Malta fever at Port Said. The disease, in human beings, was notifiable. But as sanitary laws in Egypt are very lax, there were few notifications. Except for cases occurring in the two hospitals, none of the few that were notified were diagnosed by any method except by the type of fever seen clinically. Among the native Egyptians the disease must have been especially prevalent, for many cases were seen that had not been notified. There must also have been a large incidence among the poorer Maltese, Greeks, and Syrians that was not recognised. In 1906 the records of fifty-five

[1] "The Prevalence of Mediterranean Fever in Port Said." The JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, January, 1906.

cases were collected, the diagnoses being based on their positive agglutination reactions. And this was all the information that could be obtained concerning the prevalence of the disease in a town which has a population of 50,000. The endeavour to count the actual number of cases which occurred that year was not very successful. All cases of fever occurring in or being admitted to the hospitals were more carefully observed and the local practitioners were asked to send bloods of doubtful patients to the Health Office for examination. Few, however, complied regularly. And as the natives often objected and declined to have their bloods taken, and usually refused medical attendance, even when it was offered gratuitously, the attempt to obtain exact figures of the incidence of Malta fever among the human population of Port Said was given up. One point which is of considerable interest was discovered. As stated before, fifty-five cases of Malta fever had been recognised in the hospitals during the year 1906. But during the year 1907 the number fell to ten. Inquiries in the town showed that this reduction was general and not confined to the hospitals: all the doctors agreed that there was less Mediterranean fever. The explanation was discovered in an epidemic of pleuro-pneumonia that had attacked the goats during the winter of 1906-7, and many had died. In 1908 and 1909 Malta fever again became very common, but there was the same difficulty in obtaining exact information as to its prevalence; the dead goats had been replaced by fresh importations and by breeding.

As it was impossible to estimate accurately the amount of human Malta fever prevailing at Port Said, it was determined to attack the question from the aspect of goat infection. In 1905 the number of milch-goats at Port Said was about 800. During the epidemic of pleuro-pneumonia this number fell to 600. After this the number increased again quickly, for Port Said was rapidly growing in size and the demand of the shipping for milk had become much greater. The goat census taken at the end of 1910 showed that there were nearly 1,400 animals in the town.

The goats were either of Maltese or Syrian stock, although the two breeds were frequently crossed. As at Malta, it was the custom of the goatherds to drive their animals about the streets in flocks, the goats being milked at the doors of the houses. Garbage was the chief food for the milch-goat at Port Said, as at Valletta, and this animal was one of the principal scavengers of the town. The Port Said goatherd scorned stables or zaribas, and the animals were allowed to look after themselves or were left in charge of small

native boys. There were few cows, and goats supply most of the milk to the residents, and to the shipping in transit through the Suez Canal: there were no regulations controlling its sale or its purity. Probably many cases of Malta fever occurred among the passengers on ships leaving Port Said, and some outbreaks have been recorded.

In consequence of these enquiries and as a result of the work of the Mediterranean Fever Commission, which had recently demonstrated the transmission of the disease by the goat and its milk, one hundred goats were examined during the spring and summer of 1908. There were then about 1,000 milch-goats in the town, and these were divided up into flocks of varying dimensions owned by Maltese, Greek, or Arab goatherds. The flocks were found to consist of goats of both the Maltese and Syrian breeds. The thoroughbred Maltese goat differs greatly from the thoroughbred Syrian goat. The former is a much larger animal. It has big udders, gives much more milk, is more valuable, and can always be distinguished by its straight nose. The Syrian, Arab, or *balady* goat is small, has diminutive udders, but a large hooked "Roman" nose. When these two species are interbred, it is not always easy to distinguish the nationality of the animal, but as a rule the characteristics given serve the purpose. The goatherds themselves differentiated their goats by calling them either "Malti" or "Balady" as the case might be.

Of the hundred examined, twenty-one were found to react positively to Malta fever—in each case an agglutination of over 1 to 50 being required. Of the hundred examined, in fifty-seven the Maltese features predominated, the remainder being regarded as Syrian. Of the twenty-one which reacted positively to Malta fever thirteen belonged to the Maltese breed. But this was random sampling, and it was realised then that it would not be safe to assume that 21 per cent. of the goats at Port Said were infected with Malta fever. The error was a great one, as proved later, for it was subsequently found that only 4 per cent. were really infected when all the goats in the town had been examined. So with the ratio of Maltese to Syrian goats in the town. Also the correlation of Malta fever to that ratio. It was found, as then expected, that this random sampling of a hundred specimens had given hopelessly false deductions. But it was sufficient to show that Malta fever was very prevalent among the goats, and that measures against these infected animals would be well justified.

The Health Office then memorialised the Egyptian Government.

In a Report, dated December 1908, the figures given above were quoted and the nature of the disease explained; the discoveries of the Malta Fever Commission were summarised. In that report it was suggested that the best method of dealing with the disease would be the destruction, or prolonged segregation, of all the infected goats in the town, and the regular examination and control of fresh importations into Port Said, with means of dealing with infected animals as they were discovered. The cost of buying and slaughtering the already infected goats was estimated at £200; for this sum the town could be rid of the disease.

A delay of one year occurred while the writer was absent in Cairo (1909), and it was not until early in 1910 that the matter was reopened. Then steps were taken to examine all the goats in the town of Port Said. A census of these animals was first essayed. It was found that the total number had increased to 1,365. Of these 322 were Maltese, while the remainder were "balady."

Then a new difficulty arose. The goatherds began to object to the examination of their animals; they had become suspicious as to the intentions. This was overcome in the following manner. A Commission was formed, presided over by the Governor of the Suez Canal, and consisting of the Health Officer, the Veterinary Inspector, two notables of the town (one of whom was a local shipping meat and milk contractor), and two goatherds—the latter being nominated by the goatherds themselves. This Commission called all the goatherds together and explained to them the methods to be adopted to exterminate Malta fever from Port Said. The part played by the goat in the dissemination of the disease was defined, and the goatherds were told that it would be necessary to examine the bloods of all the goats in the town and that the Government intended to buy up and to slaughter all the infected ones; the Commission was to arbitrate on the question of the prices to be awarded to the owners. This course was necessary because the sanitary laws in Egypt do not easily allow the destruction of property, even for the purpose of health. After some discussion the goatherds agreed.

The next step was to examine all the goats. It was an undertaking of some dimensions. Every day fifteen goats were brought to the Health Office for examination. A veterinary surgeon punched the ear of each goat with clippers, taking a sample of its blood in a glass capillary pipette. A wire was then twisted round the animal's neck and to this a metal number was affixed and

sealed. The pipette was labelled with the same number, and it was sent to the Hygienic Institute at Cairo for examination. At first some goatherds tried to bring the same goat twice for examination, but the hole in the animal's ear and the number on its neck enabled the fraud to be discovered.

Once a fortnight the results of the blood examinations were received from Cairo, and then the flocks were assembled at the abattoir and the Commission picked out the infected goats by their numbers. These infected goats were paraded and their individual prices judged in the presence of their owners. Those animals that had given positive agglutinations were then slaughtered. Until the fortnightly assembly the numbers of the infected goats were kept a secret, for it was found that some attempts at fraud were to be tried; weak and poor goats were to be impersonated for strong Maltese ones, and their numbers changed. This was frustrated by writing a description of each animal when the blood was taken, and comparing it with that description at the abattoir.

In this way all the goats, male and female, at Port Said were examined for Malta fever, and all the infected animals were killed. The average price paid for each was about £2, but this varied with the size, condition, size of the udders, and the age of each goat. The greatest care was taken to see that the individual animals were not confused. A total of 1,362 goats were examined (three had died since taking the first census). Of these sixty-one were found infected. Of the total examined 322 or 23 per cent. were Maltese. Of the sixty-one infected and slaughtered twenty-six were Maltese. The correlation shows therefore that the Maltese goat is much more frequently affected with Malta fever than the Syrian breed. This fact is of great interest, for the disease seems to have followed the Maltese goat in its peregrinations over the globe. Of the thirty-five "balady," Syrian, Arab, Egyptian or native goats that were also infected all had some Maltese blood in them. The greater the amount of Maltese strain the greater appears to be the susceptibility to Malta fever among goats. In other parts of Egypt Malta fever is not frequent, because the true Syrian goat does not seem to contract the disease commonly. At the neighbouring town of Ismailia, for example, the only cases of Malta fever that have occurred of recent years are those imported from Port Said. There are few Maltese goats at Ismailia. At Beyrout, on the other hand, as at Port Said, there is a considerable Maltese colony and there the Maltese goat is responsible for a number of cases of the human

disease. So with most of the towns of the Levant and the southern Mediterranean littoral. The coast towns are infected while the inland towns are almost free. In the hinterlands the pure Arab goat preponderates greatly in numbers and Malta fever is consequently less prevalent. Arab goatherds have informed the writer that the Syrian breed withstand dry climates better and therefore are more economical therein, and state that the Maltese animals only give plenty of milk when near the sea; one goatherd jokingly called a large Maltese goat *Nur el bach*—"the light of the sea."

After destroying all the dangerous goats in the town the next step was to lay an embargo on the importation of infected animals into Port Said. This was done through the Quarantine Department. It was arranged that any goats that arrived from Malta should have their bloods examined before being allowed to enter the town. The Syrian goats being less commonly infected are now more frequently imported, but they are examined similarly. The result has been to stop the importation of milch goats and to encourage local breeding. In this way a large number of healthy goats should replace those killed for disease. The danger of Malta fever being imported into Port Said is now, therefore, eliminated. In this way the town has been cleared and will be kept clear of it.

Unfortunately the exact way in which Malta fever is conveyed from one goat to another is, at present, unknown. It is possible that the *Micrococcus melitensis* has some existence elsewhere besides goats or men. In this case the disease may reappear. A repetition of the measures described above will soon cause its disappearance again.

It will be noticed that the evidence of the agglutination reaction was considered sufficient for the slaughter of the goats. On this evidence alone sixty-one animals were killed. This may be criticised. But the presence of the *M. melitensis* in the milk or even in the blood of infected animals is not very constant. As in the case of infected human beings, the micrococcus appears in gushes in the blood, urine, and milk, and then days may pass during which it cannot be found. It was therefore considered that the agglutination test properly controlled would give the surest results. It certainly enabled infected animals to be slaughtered with less delay than if the more tedious examination of its milk or blood had been undertaken. It is, of course, possible that more goats were slaughtered than was absolutely necessary, for some of the animals that reacted and were killed might have recovered

from the disease. But it erred on the side of safety and the disease has been completely exterminated. It is also possible that one or two goats might have had the disease in its very earliest stage and thus failed to react—time alone will show if this was the case. The last infected goat was slaughtered at the end of 1910, and fresh importation of the disease is prohibited. In this way Malta fever should cease to exist at Port Said. It will be interesting to watch the results on the human population of the town, but it is a pity that there is not a means of stating accurately the number of cases that occur every year. The question arose as to the advisability of segregating the infected goats until they had completely recovered. It was found that this course would have been more expensive than buying the animals and slaughtering them outright. The disease in the goat is so chronic that it is difficult to say when recovery has actually taken place, and in the meantime the goats must be fed and cared for. It was better to eliminate the disease once and for all.

MALARIAL FEVER IN GIBRALTAR.

By Major C. E. P. FOWLER.
Royal Army Medical Corps.

I am not aware that primary cases of malaria have ever been reported as occurring in Gibraltar, and those quoted below may therefore be of some interest, as they form almost irrefutable evidence that the disease can occur and originate on the Rock itself. Nearly every year a certain number of patients are returned in the military statistics as suffering from malaria. The patients are soldiers who have arrived from some station where the disease is endemic. For instance, last February a draft of about 200 men was landed from Aden to join the battalion here. From February to August twenty-five of these soldiers suffered from relapses and were admitted to hospital. The infection contracted by them has nothing whatever to do with the local conditions.

Malaria is very prevalent in certain districts in Spain, within about 10 or 12 miles of Gibraltar, such as Almoraima and the Second Venta. At these places there is every opportunity for the breeding of the anopheline, there being marshes or stagnant rivulets in abundance scattered through the Cork Woods.

At certain times of the year malaria is very rife amongst the population, and one can see the signs of its ravages on the cork workers, charcoal burners and others living near the marshes. The species of anophelines found are *Anopheles maculipennis* and *A. bifurcatus*. The former is much the more numerous, and is a well-known carrier.

Many places within a shorter distance of Gibraltar have been examined, but the anopheline has not been found. From June to October the whole country in the near neighbourhood of Gibraltar is almost completely dried up. What little water remains is nearly all saline. On the Rock itself the capture of an anopheline has never been noted. There are really no likely spots in which this insect would be expected to breed. *Culex fatigans* and *Stegomyia fasciata* are extremely common, and breed in the fresh-water tanks to which they gain access, or in the sanitary or brackish water tanks. They will not go to the latter, if by any possibility they can obtain access to the former. Iron or concrete tanks are seldom or never used by the anophelines above mentioned for breeding purposes, and it is more than probable that, if introduced, they would die off at once. In the public or Alameda

Gardens there are collections of ornamental waters more suited to their requirements, but here the water is brackish, and therefore it would be most unlikely for the anopheline to be found inhabiting it. In any case, the fact remains that in spite of all endeavours and the collection of thousands of larvæ, an anopheline has never been brought to light.

The cases are as follows, and for their clinical history, &c., I am indebted to Surgeon Ramsay, R.N., and to the courtesy of Deputy-Inspector-General Lilly, R.N., for leave to publish the same:—

(1) *Boy*, aged 6, born on and never left the Rock even for a day; Lived with his parents in the Dockyard employees' quarters, which are situated within 50 yards of the dock. Surgeon Ramsay asked me to see the case, as it was clinically so typical of malaria.

July 26th, 1910.—Patient examined. Spleen enlarged 1 inch below edge of ribs. Blood smears were taken and displayed the mild tertian parasite in abundance. The disease yielded readily to quinine.

(2) *Dockyard Employee.*—Engine-fitter, living on the old battleship "Calcutta," which is moored alongside the dock and within 200 yards of Case No. 1. This man arrived in Gibraltar in February, 1907. He had served five and a half years in Bermuda, and left there in 1904. He stated that he never had any fever in Bermuda, nor whilst at home from 1904 to 1907, and had been in good health up to this attack. He had occasionally been in Spain for a few hours, but had never passed a night away from Gibraltar.

On July 30th, 1910, the clinical symptoms were quite typical of malaria, and the spleen was enlarged to 3 inches below the edge of the ribs. Blood smears showed an infection with the mild tertian parasite. Recovery at once under quinine.

Dockyard Employee W.—Boiler-maker. This man arrived from England on July 5th. He had never served abroad before. From July 5th to 23rd he was quartered on the "Calcutta," and on the latter date moved to the single men's barracks, which are about 20 yards from the quarters of Case 1.

On July 30th, 1910, the clinical signs and symptoms were typical of malaria and the chart was that of a mild tertian infection. Blood smears showed this to be the case. Recovery at once under quinine.

It is an interesting question how these patients became infected. It is rather a striking fact that they all fell ill within a week of each other and were living in close proximity. No other cases could be found, although a careful watch was kept on all the people occupying the Admiralty quarters.

There are two main questions at issue: (1) The source of the parasite; (2) the transmitting agent.

As regards (1): the fact that there were a certain number of soldiers infected may be practically dismissed, as the barracks in which these men live are a long way from the quarters in question, and there are many houses between. There are occasionally ships in dock which have come from a malarious port. Only warships or vessels trading with the Admiralty are admitted into the harbour or dock. However, it is possible that a ship with a few infected individuals may have been somewhere in the vicinity.

(2) Granted that the latter part of (1) was as stated, then how was the parasite transmitted?

Has the presence of anophelines been overlooked? If so, why have there not been previous and more cases? Can another species of mosquito besides the anopheline convey the parasite? Such a thought is not altogether a heresy, although the whole weight of our present knowledge goes to disprove it.

Were infected anophelines brought by a ship berthed in or near the dock, and did they transmit the parasite? This is possible, but improbable. I must confess that I am completely at a loss to account for the causation of these cases.

United Services Medical Society.

QUESTIONS CONCERNING THE MEDICAL STRATEGY OF LONDON.

By Major E. B. WAGGETT.
Royal Army Medical Corps (T.).

Territorial officers are seeking the solution of problems concerning the medical strategy of London. To many of the questions which arise no authoritative answer has been given, or at all events published. As you kindly give me the privilege of speaking in the presence of military experts this afternoon, I seize the opportunity to propound some of these questions, and with the express intention of provoking criticism I bring them forward in the form of statements, the foundations of which are far from secure.

From the military standpoint we must look upon London as an unfortified town built upon that border of the British Empire which lies nearest to a powerful rival. By reason of her geographical position London cannot serve to-day as the base of military operations against an aggressor from the East; she is, rather, an outpost, and a vulnerable one at that; for in spite of her strategic disadvantage, she is the centre of government and of financial and commercial activity, and incidentally the home of one in every six inhabitants of Great Britain. Consequently she comes to be the natural objective of the invader.

The siege or storming of so great a city is neither practical nor necessary, for the successful delivery of a moral blow will satisfy the purpose of the enemy. As a psychological unit London is exceedingly sensitive. No local bonds unite rich and poor, employer and employed in any useful degree. No statesman can reckon on inspiring London with a common enthusiasm to a common effort, and in view of the cosmopolitan character of a considerable section in every class of life, we may assume the necessity, under the stress of foreign invasion, of enrolling the reliable manhood of the town as special constables rather than as territorial defenders. The moral breakdown of London implies a disgraceful capitulation which would shake the Empire to its foundations—to put the matter tersely, the invader only needs "to

make London squeal." If he succeeds in doing this he will be more than half way to having an Empire tumble into his lap.

The honour of forming the ultimate barrier between the enemy and this fateful city falls to the lot of the London Territorial Divisions, and although everyone applauds the historic attitude of placing the frontier of the Empire at the shores of the enemy, still it is desirable that the mind of London should be reassured by the existence of some military protection. Granted the actual landing of foreign troops upon these shores, a screen of troops must be thrown out around London, if only to keep her quiet until a mobile force of regulars has had time to concentrate and to strike the enemy. The days pending the delivery of the blow will be fraught with a degree of international political tension difficult to realise, and the kick of the international scales will be influenced largely by the moral stability of London. It is during that time of crisis that the Territorials must show to advantage if they are to serve any purpose, and I put it that a large proportion of the burden of making things go smoothly will rest upon the shoulders of medical officers.

What is the terrain over which we are likely to work? The London area can be seen at a glance upon the map. The place is essentially a port upon a tidal river, and is built at the spot where the high road from the Continent found the lowest crossing place as it passed over the river north-west into Wales, and north-east into East Anglia. The Thames is the stream which drains a triangular chalk basin with an apex a dozen miles west of Marlborough. It is reinforced by water from the Midlands which cuts through a gap in the chalk at Streatley. The chalk basin has escarpments north and south, which respectively form the Chiltern Hills and the North Downs. Eastwards the London area may be considered to be bounded south of the Thames by the river Medway. No marked geographical feature defines the London area on the north-east. Essex is traversed by a series of rivers rising in the chalk uplands and flowing south-eastwards down to the sea. Either the Chelmer, the Brain, the Colne, or the Stour, may be regarded as the limit of the area. These river valleys are the only land features in this region.

In mentioning the natural land features around London I do not for one moment wish to imply that any of them have been chosen as defensive lines by those responsible for the strategy of London. Attempts on my part to penetrate the secret of the London defences by questioning officers who are responsible for

them have met with no sort of success—I have merely been informed that no one outside a small circle knows anything about the matter. A Territorial officer is therefore at liberty to use his imagination and to conjecture that those in authority will make use of all the slender resources at their command in order to hold a mobile and expert enemy until such time as an efficient striking force can be collected to give him battle. I take it that well-marked land features will be chosen in order to facilitate the handling of reservists and Territorials by officers who have little or no experience of their men under war conditions, and I venture to predict that the land features chosen will be as far removed from the metropolis as the numerical strength of the defensive forces will permit. It requires very little imagination to see that if a cordon of defensive troops is drawn close around London, the nervous tension of the metropolis will be strained to breaking point, and any small localised reverse might easily be followed by so marked a psychological effect that it would result in the hoisting of a white flag upon the Mansion House. London must not be allowed to hear or to see the noise and tumult of battle, and at all hazards the arena of war must be kept at least 20 miles from Westminster.

The one and only strong point of the Territorial soldier is his knowledge of the country. I am not at all sure that the training of the London medical units does develop any local military knowledge, and indeed I am fairly certain that many of us do not consider our duties in any special relation to the geography of the Home Counties, or to the peculiarities of the metropolis.

As an instance of my meaning, and just to serve the purpose of a peg upon which to hang some remarks, I will cite the answer of a very efficient Territorial officer when I asked him where he would place a general hospital on mobilisation of the London Territorials. He replied "either in huts or canvas in Regent's Park." I know that the authorities have no such intention, and I venture therefore to argue that my friend's reply was incorrect on strategical, political and sanitary grounds respectively.

From the strategical standpoint this city is, as we just remarked, an excessively exposed and vulnerable spot, and if one thing is certain it is that London will not in any real sense form a base of military operations against an invader. Presumably the defence of Great Britain will be based upon one of the ports of entry of the food supply, say Liverpool or Bristol, or perhaps an intermediate point, such as Birmingham. Possibly Southampton or Portsmouth, but at all events one may predicate that London will

be about the most easterly point of the lines of communication; in no real sense a base and consequently not the medical base. One may assume that the seat of government will be shifted westwards, and it is more than probable that efforts will be made to shift as many of the inhabitants as possible in the same direction; for the problem of the food supply of the civil population will undoubtedly form an extremely important item in the game of this war.

It is not difficult to imagine that the objective of any general invading these shores would be to upset the equanimity of London and the immense interests concentrated there, by disturbing the food supplies, and it is unhappily not difficult to believe that the successful cutting of the railway systems running westwards from London would be followed by a popular outcry in favour of capitulation. Indeed, the mere threat of the railways would go a long way to ensure his success, and one must not forget that during the first few days after the outbreak of hostilities, the enemy now resident in this country, would find opportunities of tampering with the permanent way.

For the purpose of coming in touch with the medical strategy, let us, therefore, assume that an attempt is being made to isolate and cow London by three forces landing north, south, and east of the capital. Forces landing on the Wash and the Sussex coast respectively, converging on Reading, and destroying London's rail communication with the west, would, if successful, give a third force landing in Essex the easy task of wringing capitulation from the demoralised metropolis. One may conjecture, therefore, that every endeavour would be made by the defending forces to head the invaders eastwards away from the railway lines. The invader, prepared to obtain at all costs a rapid moral result, would probably run very considerable and unusual risks for the sake of impressing the populace of London with the idea of defeat before, perhaps, any very serious reverse had been sustained by the British arms. I take it that one of the special functions of the more or less immobile Territorial brigades would be to prevent the access of the enemy within, as one may say, the moral confines of London. Under these circumstances the London Territorial forces would form the apex of the angle of troops pushing the enemy eastwards off the railway communications, and I suggest that it is not near that apex, namely in London, that the medical base organisations would be placed. Everything which could be moved would be moved westwards towards the food supply. It is, I believe, correct to say

that, in spite of the existence of emporia within it, there is less food per mouth in London than in the small towns and villages. As to the water supply of London, the margin is not so great as is generally supposed, and it has been asserted by generals of ability that their chief effort in assailing London would be to curtail the water supply by cutting the banks of the Thames. It is certain that the chalk-wells of the London area, in which the water level is dropping year by year with remarkable rapidity, would fail to afford a satisfactory supply for any length of time. But in view of the short duration of a campaign likely to be fought under modern conditions the water-supply need not greatly disturb us, for the raw reserved water is sufficient for forty-one days' full rations, and, of course, for very much longer at short rations. I am indebted for this information to Mr. Rutter, of the Metropolitan Water Board. One must not forget that these calculations would be upset by the successful explosion of a mine under the embankment of Stanwell reservoir; but no doubt such a loss could be met by a reduction of the amount of water at present allowed to flow over Teddington weir, the minimum of which is determined upon sanitary considerations.

Not only from the strategical, but from the political point of view, it is very undesirable to bring the wounded to the metropolis. Possibly the whole of the orderly element of London would be organised and strained to the utmost in the regulation of the affairs of a disturbed and disorderly population, and one can well imagine that unfortunate incidents, not to say unseemly street-fights, would occur when bread-carts passed through the streets. Is it into such an atmosphere that wounded should be dragged unless some good reason exists for so doing? Even more serious than disorderly rioting would be the organised attempt on the part of an avowedly anti-national section of the community to hasten a disgraceful capitulation, and I believe that the chief difficulty of the Government of that day would be the repression of the Socialistic element. It seems to me that if the Medical Service were to pour casualties into the metropolis before the eyes of the people, the Socialist demagogues would be enabled to magnify every little skirmish into a serious defeat, and I put it that whatever else we do with the wounded, and, indeed, with the sick, we must hide them from the sensitive multitude, and not bring them to London.

Let us next consider the sanitary amenities of Regent's Park. For a week's camp in a sunny June, no doubt Regent's Park

affords a pleasant camping-ground, but in the winter months I can imagine no more dreary and insalubrious spot. As is the case with other open spaces in the near neighbourhood of London, it and they remain unbuilt upon, or have until recently so remained, because they are situated upon unadulterated London clay. The geological map shows this well. Except on steep slopes this formation holds the water, and almost throughout the winter the surface is sodden and heavy; here the mist rises on every windless afternoon and the whole clay area is cold and chilly. To place wounded men in draughty huts or tents pitched upon an undrained piece of clay, when suitable buildings can be found on every side, seems to be a waste of energy, and I have no doubt that such a plan has never for a moment been considered by the authorities.

It has been said that however unequal the contest may be between the Territorial defender and the highly trained Continental aggressor, the former will have the immense advantage of fighting upon ground with every inch of which he is familiar. This is not really the case so far as the medical branch is concerned, and it is this fact that has emboldened me to put certain questions this afternoon which I trust the experts present will be so kind as to answer —indeed, it is my hope that one of them may be induced to write a book which shall be the textbook and guide of the London Territorial medical officers.

With the exception of a very occasional staff-ride, most of our training takes place upon Salisbury Plain or Aldershot Common, spots upon which we are extremely unlikely to encounter the enemy. We have hitherto done the same practice as the Regulars: that is to say, we have utilised the W.D. grounds for the practice of manœuvres which represent the duties of the Expeditionary Force in South Africa or India; I venture to suggest that we should practise, in Surrey, manœuvres representing a campaign in Surrey, and in Essex those representing a campaign in Essex. But apart from the question of annual training, I believe that if some one in authority would write a book containing local problems and their solution, many of us would be glad to spend Saturdays and Sundays in taking parties of N.C.O.'s over the ground.

Let us consider our sanitary duties with troops in the field. It must, I think, be conceded that in the stress of a war in this country, when according to theory the Expeditionary Force will be overseas, taking with it the great bulk of the Regular Royal Army Medical Corps officers, a very considerable amount of responsibility

will be thrown upon the Territorial officer. He will, I take it, be asked to give advice concerning camping-grounds, a matter of the utmost importance where citizen soldiers not yet hardened to campaigning are concerned. Columns will not march to ready-made camping sites upon well-chosen areas, such as Aldershot and Salisbury Plain. Upon the knowledge displayed by Territorial medical officers the somewhat precarious health of the citizen soldiers will, in a large measure, have to depend. But I have reason to believe that very few of us are at all familiar with the geological conditions of the London area, or even with the geological maps of the district. I therefore make no apology for drawing attention to the geological map, and for pointing out that the geological conditions of the districts upon which we do our training, *i.e.*, of the North and South Aldershot districts, and of Salisbury Plain, do not, by any manner of means, largely obtain in the London district.

The northern portion of the London district consists of a belt of chalk 20 miles in width, sloping gently down from a northern escarpment and cut up by a number of valleys running south-east to the Thames basin. A similar chalk belt some 5 to 10 miles in width exists on the south side; this slopes northwards from a southern escarpment; south of this escarpment, at a distance of 3 or 4 miles, runs a broken string of sandstone hills. A section taken north and south shows that the chalk forms a continuous basin under London, and that overlying the central portions of the basin is a thick mass of London clay. Here and there upon this clay are found patches of sand, the patch with which we are familiar at Aldershot being by far the largest. Elsewhere at Harrow, Hampstead, and in Southern Essex, other small patches of these so-called Bagshot sands are to be found. In the Woolwich area, and in patches along the northern slopes of the Kentish Downs, areas of sand and gravel are also seen. From Staines in the west to Harwich in the north, and Shoeburyness in the south, there stretches a great unbroken mass of London clay, which is almost impermeable to water, and is the birthplace of the Thames valley mists and the London fog. Large tracts of this cold, uninviting country have, until quite recently, remained unbuilt-on.

One cannot be content with a study of this so-called "solid" geological map. Here is the "Drift" map of the London area, which shows that the regular strata are covered by a veneer of superficial deposits which vary from a foot or two to 20 ft. in thickness. For instance, here in London itself we find that the

best residential quarters are situated upon a bed of fine dry gravel, and the map at once explains the remarkable difference which exists between the atmosphere of Hyde Park with its 20 ft. of gravel, and of the Regent's Park with its unadulterated London clay.

The Drift Map shows extensive patches of clay and heavy loam upon the chalk. Any one familiar with the Downs above Brighton, with their dry springy turf and brisk air, will be disappointed on exploring the chalk region of the Chiltern Hills. Here the top of each ridge is covered with a thick layer of very tenacious clay, and similar, but more loamy patches are found upon the North Downs from Guildford right away to the broken edge at Dover. These patches are fairly well defined, and are clearly marked in the map; and a little care in the choice of ground will make all the difference between a miserable and a healthy pitch. It is generally possible, by avoiding the extreme summit of a chalk ridge, and also the hollow of the ravines, which commonly dissect the Downs, to find large areas upon the flanks of these ravines where the chalk is covered by no more than a few inches of surface soil. As a general rule, one may get a dry pitch upon such a slope, for the water from the clay cap upon the summit readily drains into the interstices of the chalk before it descends far upon the surface of the slope.

At the foot of the chalk escarpment there is always to be found a slip of close blue clay, the gault, which holds up the water, and even in summer gives a wet subsoil by reason of the water running over its surface after percolating to the bottom of the chalk. To the south of the gault strip, in the Weald of Surrey and Kent, there is always present a ridge of fine dry sandstone, the Lower Green Sand, which is seen well developed at Hindhead, Woolmer, Leith Hill, Redhill, Sevenoaks, and so forth. Almost anywhere up this area one may find good camping ground; but it is necessary to point out that both on the green sand and on the Bagshot sands of the North Aldershot area one comes across extremely wet patches, due to the presence of an underlying shell of impervious ironstone, or of a local patch of clay, perhaps only a few inches thick. Such a condition can generally be detected by the character of the vegetation, and particularly from the presence of the cross-leaved heather. I understand that in consequence of the choice of similar patches as camp sites in the New Forest, that whole region has been condemned as unsuitable for manœuvre purposes. Very often these wet patches form elevated table-lands which mislead the unwary into false hopes of their dryness.

So far as I have been able to see, the Woolwich and Thanet beds have given an excellent dry surface even during this wet spring. A glance at the map will show that the valleys are usually covered with so-called valley or river gravel. This is very pervious to rain, and granted that the level of the subsoil water does not rise unduly and flood the gravel, these low-lying places are often drier and firmer than the more elevated clay surfaces around them. In Essex it is noticeable that strips of river gravel have become built upon in preference to the higher ground. In that county the difficulty of choosing camp sites in rainy weather will be especially great. The seaward portion has considerable areas of gravel, but almost the whole of Essex on the landward side of the Roman road to Colchester is covered by a layer of glacial or boulder-clay, which for the most part is very heavy in winter, and, so far as I can see, the driest spots this spring are the river valleys.

The data concerning the volume and nature of the water supply of all the areas which concern us are available in the form of the Water Directory. I propose to make out a map of these areas, for at present I understand none exists. The map in the Royal Commission Report, 1901, does not give the areas outside the sphere of the Metropolitan Water Board. To illustrate the value of such a map, I may mention that in going over supposititious camping grounds the other day, I found an excellent elevated spot with a small reservoir attached. Inquiry proved that the pumping station was situated many miles away in country which probably would be occupied, or at least threatened, by the enemy. A mile or two farther on an equally good camp site existed, which had a supply from two sources, one in the enemy's sphere of influence, and the other well to the rear of our lines. Both these places were far removed from any natural water supply, and were high up on the chalk where digging and Norton's tubes are useless. One may by parenthesis mention the dew ponds which are to be found at fairly regular intervals upon the Berkshire and Sussex Downs. The London defences might be strengthened by the construction and protection of such ponds upon the North Downs. Existing dew ponds commonly form a watery grave for sundry small beasts and birds, and the water must, therefore, always be boiled for drinking purposes.

Water may be obtained from the gravel wherever it exists in low-lying parts of the London area, but in such a densely populated countryside such water will usually be regarded with suspicion, and on this account the billeting of troops in villages which receive no

water supply from the water companies will always be a source of danger. It is, of course, well known that these water companies obtain their supply largely from artesian wells in the chalk or the lower greensand below it. The water of the Metropolitan Water Board is largely derived from the Thames, and it is interesting to note that searching tests of raw Thames water taken above locks prove it to be singularly free from the presence of pathogenic micro-organisms. Furthermore, that water purposely inoculated with typhoid bacilli is found to contain none after four weeks' storage. The sanitary officers of the London Territorial forces will be confronted with extreme difficulties arising out of the densely populated character of the terrain; but, on the other hand, their task will be facilitated if they acquire a knowledge of the topography of the water company supplies.

The local sanitary conditions are so well understood by the Sanitary Medical Officers of the London Territorial Divisions that it is needless to dwell further upon these points, and I have ventured to draw attention to the geology of the London district largely because a knowledge of it at once gives the clue to the geography of this region—and I cannot help thinking that all medical officers should be fully acquainted with the physical features of the country.

Let us now take our purely military function—the collection and distribution of sick and wounded. A glance at the layered map shows that the geology is closely followed by the physical geography of the district; and upon that the strategy and tactics will largely depend.

Here upon the north and the south of London the chalk escarpment forms the prominent feature, and south of the escarpment of the North Downs is this row of lower greensand heights. Here upon the east, where the open end of the triangle of depression slopes off into the sea, we find low-lying land cut up by large estuaries, the largest of which is that of the Thames. North of Hitchin the chalk escarpment fades off, and leaves Essex with no marked features. It is merely traversed by a set of small rivers which would present no serious barrier to a determined enemy.

It is no business of a Territorial Medical Officer to have any ideas upon strategy, but in seeking to foresee the kind of work which may fall to our lot one cannot help being impressed with the idea that the function of the defensive forces will probably fall into three types. In the first place there will be the occupation of positions for the purpose of limiting the field of activity of the

invader; and in spite of the present revulsion against the occupation of elevated ground, one cannot help believing that the North Downs, or rather the greensand heights south of them, and also the Chiltern escarpment, will be held in some force by troops unfitted for work requiring great mobility.

Secondly, a large section of the defending force will be called upon to fight a series of delaying actions in the Essex region. Upon these will fall a task of great difficulty. One may take it for granted that the invader's force will be characterised by extreme mobility, and that he will endeavour to form a wide front and envelop the defensive troops. The enemy, moving in a country well known to them by study, will doubtless take advantage of the possession of the initiative which their high degree of training in large bodies and their mobility will give them. Close country must always favour highly trained troops choosing their own point of attack. The numberless roads which intersect Essex in all directions, generally concealed by fences sufficiently high to give cover to cyclists, will furnish facilities for rapid deployment and engagement with detached bodies of the defenders in detail. This portion of the campaign will presumably consist of a series of local delaying actions, and it is here that the senior Medical Officers will feel that lack of confidence in their juniors which is the price paid for the rarity of divisional manœuvres. It is in this most difficult type of campaign that the untried Territorial Medical Officer will be thrown upon his own resources, dealing, as he probably will, with a front which is always shifting to the rear and often broken or in danger of disruption.

In the third place, presumably after some days' delay, there will be the campaign of an efficient mobile body advancing to crush the invader. The function of the medical service of this striking force will conform in a large measure to the type laid down in the text-books, and we need not specially discuss it.

Let us examine the duties of the medical service in typical cases of the first two categories, taking first, as being the simpler, an instance of troops attacked in position. For example, let it be supposed that a determined invading force bent, not upon the occupation of the county, but upon the demoralisation of London by the cutting of her railway communication with a base at Birmingham, and prepared with that sole object to live upon the country already perhaps salted with food depots—let us suppose such a force to have penetrated 80 miles from its landing place on the Wash and to have arrived in the neighbourhood of Tring.

Headed off there by a superior force guarding the Midland and Great Central Railways, it attempts to descend upon the rear of London with the same moral object in view. The mere audacity of the move would, in point of fact, probably secure the invader's purpose, favoured as it would be by the tension of the political atmosphere. However that may be, let us examine the medical functions concerned in the resistance to an attempt at forcing the passage of the defiles between Tring and Dunstable, and let us assume that, thanks to the natural strength of the position, the defence is held good. In such a fight the duties of the regimental medical officers and of the field ambulances would follow fairly closely the rules laid down in the manuals. The slightly wounded would be directed to a collecting station at Berkhampstead, five miles in the rear, while a dressing station would be opened at Aldbury and developed into a "tent division" in some of the very suitable new villas there. From that particular position the wounded would doubtless be conveyed direct to the rear by a hospital train on the London and North Western Railway; but should they be *carried into London?* It would seem very much more desirable to deposit them at Hemel Hempstead at the large and well-equipped school at Locker's Hall, or else at the Orphan Asylum at Watford. Why take them into London, where their arrival would create precisely that moral effect which the enemy desired to produce, namely, the effect upon the populace of danger from the north-west?

It has been seriously affirmed that the chief value of Regent's Park as a General Hospital is its proximity to Harley Street. Can we not trust eminent surgeons—who, in pursuit of private practice, will welcome a daily call to Watford—to come so far to attend the wounded? In the kind of broken warfare which will occur around London is it desirable to congregate all the seriously wounded of a division to one spot—as is, of course, necessary in a more or less hostile or unpopulated country? In a word, need the wounded be carried into the disturbed political atmosphere of London, passing *en route* a hundred suitable resting-places, simply in order to permit civilian surgeons to sleep in their own beds?

An eminent Territorial Medical Officer has suggested that all the clubs on the south side of Pall Mall should be turned into military hospitals—imagine the moral effect upon the populace of the daily carriage of wounded men across the crowded pavement. With the adoption of buildings such as clubs for hospital purposes, I as a civilian surgeon have every sympathy. In my experience the normal hospital building has no real clinical advantage, and on

the other hand, very marked disadvantages which are only counterbalanced by the facility of organisation. Patients "do," I believe, even better in ordinary dwelling-houses than they do in regular hospitals, and the examination of a modern well-appointed villa goes to show that it will accommodate from thirty to fifty cases under the best possible conditions. Thanks to the spread of first-rate medical education, the London hospitals have by no means a monopoly of skilful surgery, while the present-day development of Red Cross contingents promises a good supply of conscientious nurses quite capable, under the guidance of a few experienced sisters, of dealing with all the casualties of war without embarassing the resources of the civilian hospitals, which will be strained to the utmost in time of famine and political disturbance.

The instance I have cited is not an isolated one, indeed, the conditions may be repeated almost anywhere in the home counties. Take an action near the Leatherhead gap of the North Downs—schools and clumps of new well-appointed villas abound, and no surgeon could wish for a better hospital than that provided by Sandroyd School eight miles to the rear on a good road, with a convalescent camp ready to hand in the colony of comfortable villas built upon the high sandy ground above Church Cobham and surrounded by a community of persons eager to undertake nursing duties.

I have in mind that perhaps this decentralisation of the clinical care of the sick would, in the event of invasion, be by no means unwelcome to those occupying high commands in the medical service. The task which will fall to them, of organising those additions to the medical service which the inevitable increase of the combatant forces will entail, may prove sufficiently exacting to make them not unwilling to transfer the responsibility for the care of the sick largely to civilian shoulders.

But if this degree of decentralisation is undesirable, are there strong reasons why London should be chosen as the site of the general hospitals? A glance at the railway map shows that although all roads lead to London, there is nevertheless a very complete network of communications around London. There is no difficulty in taking wounded past or around London, from any one point to any other. Consider, for example, a hospital train evacuating wounded after a battle at Sevenoaks; it could swing round through Bromley and Croydon, or Wimbledon to the Holloway College at Egham, in a couple of hours and with two shunts; and on the north side of London the communication is simpler still, and I fancy a wounded

man could pass from Ware to High Wycombe School with less disturbance than he would to St. Paul's School at Hammersmith. I have marked on the map the main features of the railway connections, and also some fifty buidings suitable for stationary and general hospitals; while further west there are many places, such as Marlborough College, much nearer the food supplies.

Turning to the north-east district, let us take the case of a fight concerning the passage of the Chelmer.

Let us assume that a highly mobile force, landed at Mersea Island and the shores of the Blackwater, has struck a successful blow near Colchester, and, having passed Braintree, is attempting to envelop a force of ill-trained Territorials who are attempting a delaying action at the line of the Chelmer. If it is asked, "Why attempt to hold the line of the Chelmer?" I will reply that a well-recognised military authority only the other day told me: "You Territorials will have to make the most of these Essex streams." This particular stream can be crossed by determined infantry at almost any point. The country is pasture land and close, and one may expect an enterprising aggressor to give our regimental officers who are unused to commanding units in actual war, a trying time, choosing as he will his own points of attack; for we must for the present, at least, assume that hedges and ditches will continue to offer cover until aeronauts have proved them to be useless. One may then expect close hedgerow fighting, and no chance of carrying wounded to the rear until nightfall. Under these conditions the care of the wounded must of necessity fall largely into the hands of the regimental medical *personnel.*

In a recent paper, read in this room, Lieutenant-Colonel Russell drew attention to the change which has recently taken place in the German, French, and Austrian armies, whereby each battalion is served by sixteen stretcher-bearers maintained and trained solely for that duty, and therefore protected by the Geneva Convention, and able to remain behind with wounded who have to be abandoned. In this home-county, fighting, with its scattered isolated combats in close country, and consequent absence of general supervision, such regimental dressers would be invaluable. It is fairly obvious that the systematic collection of wounded will be impracticable under modern conditions until nightfall. That being the case, one may, perhaps, be permitted to put in a plea for the ambulance dog, which appears to have been of the greatest service in the Russo-Japanese war. To quote from Major Richardson's recent book: An officer of the Russian Staff writes: "In finding the missing and wounded

with which the millet fields are strewn, nothing has succeeded like our pack of seven dogs. The English ones are specially intelligent. In our last engagement twenty-three men were found in unsuspected places." One may add that it is exceedingly difficult to make an adequate search of woodland country with lanterns, which throw a deeper shadow the more powerful their light; on the other hand, nocturnal conditions favour the dog rather than otherwise.

Other points in the collecting medical machinery concerned in the battle of the Chelmer present interesting problems. About the collecting station or lightly wounded station no difficulty arises; men could walk back to High Roding and Boston Cross, places traversed by broad metalled roads, but the conveyance of wounded to dressing stations by wagons presents some difficulty. In daylight the white tilts of the wagons showing above the fences would give away the position of troops in a fight where concealment was especially desirable, and possibly these tilts might be dispensed with. There is, I believe, a tendency in favour of the adoption of motor transport for the sick. On these roads, near the Chelmer, —particularly narrow, tortuous and heavy—the employment of such vehicles, especially at night would be extremely difficult. I throw it out as a mere suggestion that in the densely populated home counties, first-line wheeled transport of sick may in a large measure be dispensed with. In the Swiss army practically no ambulance wagons are employed, the authorities contending that in the lowland areas of Switzerland, where alone first-line wagons could be employed, the countryside is so densely populated that accommodation can be found for wounded within man-carrying distance of any spot. This contention is true of a large section of our home counties, and I venture to suggest that circumstances may well arise (for instance, after a delaying action followed by retirement), in which the seriously wounded may properly be left domiciled in the neighbourhood of the fight under the care of the voluntary aid detachment, rather than be subjected to the distress and risk of transport. The idea runs counter to the accepted system of collection and of the passage of the wounded through the clearing station on their way to the distributing machinery, but it seems to present a certain advantage to the patient, for in our home defence system I gather that the extremely difficult work of the clearing hospital is to be conducted by the voluntary aid detachments, the *personnel* of which must of necessity, during the early stages of a war, find its lack of military training a serious handicap.

In the hope that officers of experience may think fit to comment upon the points I have ventured to raise, may I recapitulate the main questions:—

Firstly:—As the art is long and Territorial life exceedingly short, we can never hope to become masters of the art as a whole. Had we not therefore better spend what little time we have in learning that familiarity with the terrain which the Territorial soldier boasts as his one strong point?

Secondly:—Is London on strategical, political and sanatory grounds well suited for the general hospital sites?

Thirdly:—Do not the characteristics of the country round London necessitate some modification of an organisation which has been devised to meet the requirements of war in foreign parts?

DISCUSSION.

Lieut.-Colonel E. M. WILSON agreed that on no account should the wounded be brought to London. In the South African war the wounded and sick after disembarkation were distributed in various parts of the country without serious discomfort, and there was no reason why they should not be distributed in a similar way in future wars.

Colonel MAGILL agreed that it was undesirable to bring sick and wounded to London; there were large numbers of buildings in the vicinity which were suitable for wounded, and if serious cases were collected in these, the slighter cases could be deposited in homes, &c., in the neighbourhood of the action. He did not agree that it would be possible in war to transfer wounded round London by means of circular railways. These would be fully occupied with the fighting troops.

Lieut.-Colonel MELVILLE referred to Major Waggett's remarks about the growth of heather as an example of the value of studying the flora of a district as an indication of its geological character.

CAMP SANITATION.

By Lieutenant ARTHUR J. MARTIN, M.I.C.E., F.G.S., F.R.S.I.
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This paper will be confined in the main to a consideration of certain practical details in connection with the sanitation of camps. It will deal more particularly with the difficulties which are met with on a subsoil of stiff clay. The camp referred to is that of the 6th Brigade of the 2nd London Division at Howt Green, near Sittingbourne, 1910.

(1) *Water Supply.*—Water was laid on to the camp from the mains of the local company, and was distributed by means of 4-inch pipes laid on the surface of the ground, with reserve tanks and branches to the various ablution places, &c.

(2) *Ablution Places.*—For ablution purposes benches were provided, consisting of long V-shaped troughs with a narrow shelf on each side. These benches were made of unplaned boards, but with a little care and occasionally caulking the joints it was possible to keep them fairly tight. Water was laid on either to a single tap at one end or to a number of taps placed on each side of a central feeding pipe. The trough sloped to one end and discharged over a wooden box, about 2 feet cube, filled with straw or shavings to serve as a rough filter. Fine gravel or coarse sand would probably be better.

Where taps are provided for filling pails care should be taken not to place them in a hollow, or a swamp will speedily be formed.

The whole site of the camp is covered with clay, shown on the geological Ordnance map as London clay. In such ground little or no soakage can take place. To test this point a trench was dug overnight close to a large pit which was standing full of waste water. Although the intervening space was only 12 inches wide the trench was practically dry next morning. It was therefore necessary to let the ablution water run away down the ditches.

In the disposal of waste water regard should be paid not only to the convenience of the occupants of the camp but also to the interests of other troops, and of the civil population lower down. Special care should be taken to avoid contaminating any stream, without first making sure that it is not used as a source of water supply. The camp at Howt Green occupied a flat summit, from which the ground sloped away in all directions. Where such

a course of lines of drainage presents itself care should be taken to select the one which is least likely to affect a water supply.

(3) *Disposal of Kitchen Sullage.*—An effort was made to get rid of the sullage water by means of soakage pits, the grease being first intercepted as far as possible by strainers of straw or other loose material. Owing to the impervious nature of the subsoil the pits quickly filled up and the water either had to be dipped out or overran the surface of the ground.

Where soakage pits are used the tendency is to make them large and deep. This is a mistake, the point to be aimed at being not storage capacity but a maximum area for percolation. For the same reason the circular form, which is most in favour, is the least suitable, a round pit having a greater holding capacity (in other words, requiring more excavation) for a given surface than a trench of any other form. A numerical example will make this clearer. A round pit 5 feet in diameter and 5 feet deep holds 98 cubic feet, the united area of the sides and bottom being 98 square feet, that is to say, 1 square foot of earth is exposed for every cubic foot removed. Practically the same amount of surface (actually 102 square feet) would be exposed in three straight trenches each 6 feet long, 1 foot wide and 2 feet deep, having a united content of only 36 cubic feet. A percolating area equal to that of the larger pit is thus obtained at one-third the cost in labour. Not only so, but each square foot of surface in the trenches will be far more effective than the average of that in the pit, the upper layers of the soil being naturally both drier and more friable than the stratum below.

From a hygienic point of view also it is important to dispose of all foul water as near the surface as possible, the bacteria concerned in its purification being most abundant and active in the surface soil, while the work done in the subsoil is negligible. In chalk or any other porous formation constituting the gathering ground for a water supply, deep soakage pits should be absolutely prohibited ; in clay they are practically useless.

Every effort should be made to minimise the exposure of foul water. This was accomplished in the Royal Army Medical Corps camp by filling the bottom of the pit with all the old tins which could be collected, and covering these with the excavated clay, broken into small pieces, and replaced as loosely as possible. The experiment was completely successful, and the pit, with a small extension, took the whole of the sullage water from the kitchen during the remainder of the training.

A further experiment was made with the object of ascertaining definitely how much water could be absorbed by a pit of a given size, loosely filled with the excavated material. A pit 3 feet square was sunk to a depth of 2 feet, giving a volume of 18 cubic feet, and the clay loosely replaced. The interstices were then filled with water from the adjoining pond, fourteen pailfuls of 3½ gallons each being poured in before the water showed on the surface. This is equal to 73 gallons per cubic yard, corresponding to a "water capacity" of 43 per cent. of the total volume. In this case the excavated clay was replaced immediately: had it been exposed for a day or two to the sun and air, its water capacity would have been still higher. Some of the water was of course taken up by the ground which formed the sides of the pit, and which appeared to be somewhat more porous than that in other parts of the field.

It is safe, however, to say that a large amount of water can be got rid of in this way, even in the worst soil, without any such constant exposure as occurs in an open pit. Three or four such soakaways should be formed if necessary, and used in succession, as a few days' rest would probably restore a great part of the original capacity. The two main points to be attended to are that the excavations should be shallow, and not too close together.

Soakage pits, filled in as above described, were used by Major Caldwell Smith at the Royal Army Medical Corps camp at Minster, with the addition of an improvised pipe, made of salmon tins, to convey the water direct to the bottom of the pit.

It must not be supposed that the refilling of a soakage pit with the excavated material necessarily involves a loss of capacity. On the contrary, its effective capacity may even be increased, by reason of the large amount of surface which the filling presents for the deposition of grease and suspended matter, which would otherwise clog the pores of the sides and bottom of the pit. The filling material may thus take the place of the ordinary brushwood strainer, which is at best a necessary evil. A wire cage or its equivalent should, however, be used to intercept the larger solids.

If the foul water can be conveniently led off to outside the camp, it will generally be better to break up the surface of the soil to receive it than to employ soak pits of any kind. The point of application to the land should be frequently changed, so as to avoid the formation of a swamp. Unless, however, the camp is to be occupied for several months, it will not be advisable to attempt a wide distribution of the water, as is done in the case of a sewage farm. The aim should be rather to minimise the area required by utilising the absorptive capacity of the soil to the full.

(4) *Disposal of Urine.*—Urine pits were dug, with a system of radiating gutters arranged in the usual way.

The pits quickly filled, especially in the larger camps; and in some cases the water had to be dipped out and otherwise disposed of. Some of the combatant units made arrangements with the occupiers of the arable land adjoining their camps to let the urine run through the fences, and soak into the ploughed-up soil.

In the Royal Army Medical Corps camp no such outlet was available. A connection was therefore made from the urine pit to a number of disused and filled-in latrines, the interstices of which absorbed the urine as fast as it was forced out by the filling in of the pit.

The pits should always be fenced off, so as to compel the men to use the gutters. There seems to be some misapprehension as to the function of these. They are provided to give the urine an opportunity of soaking away in the surface soil, thus relieving the central pit as far as possible. It is therefore a mistake to smear the bottom of the gutters with oil, or take any other steps calculated to prevent percolation.

The observations in section (3) as to the importance of keeping foul water as near as possible to the surface of the ground apply with special force to urine, by reason of its liability to contain disease germs. Shallow pits, refilled as already described, with the addition of radial gutters, may be employed with advantage for urine, but as soon as a few filled-in latrine trenches become available, the digging of special urine pits may be discontinued. The gutters will then be led direct to the old latrine pits.

For halts of short duration, it will generally suffice to strip off the turf to a width of 1 foot and such a length as may be necessary. This will clearly mark the spot to be used, and the fouling of the surface of the ground will be avoided. Spots thus prepared, in suitable positions near the lines, will probably be found preferable to tubs for night use. They should be lighted all night, returfed at dawn, and other spots stripped for use next evening.

(5) *Latrines.*—The latrines used throughout the camp, with one or two exceptions, have been of the short trench type, and have proved very satisfactory. The old long deep trench has nothing to recommend it; the ground in front gets wetted; it is difficult to keep the excreta covered; and the general effect is apt to be nauseating.

Even with the short trenches it was difficult to secure complete covering, the stiff clay from the trenches being very unsuitable

for the purpose. The ashes from the kitchen fires and the destructors were used as far as possible; and some fine clinker was bought.

The covering of the excreta is a matter of such importance that every effort should be made to obtain an adequate supply of fine soil. Even in a clay country, the cultivated top soil from an arable field will generally be more or less friable, and permission to take the small quantity needed could probably be secured at no great cost.

It is necessary also to impress upon the piquets in charge of the latrines, the importance of seeing that the earth provided is properly used, and that sheets of newspaper are not left about to blow into the trenches of urine gutters. It would conduce greatly to a better state of things if each tent were supplied with a roll of toilet paper.

Major Caldwell Smith has suggested the plan of cutting down the sides of the trenches for a few inches, to form benches for the men to stand on. The lateral support afforded by the sides of the benches steadies the men, ensures a central position, and thus tends to prevent the fouling of the ground. This plan should only be adopted when the ground is so firm as to obviate all risk of the benches giving way.

Very few of the latrines were provided with poles or other rests for the men. The use of these should be discouraged, as they are unnecessary, and it is difficult, if not impossible, to keep them clean.

(6) *Destructors.*—The destructors used in the various camps were of brick, set in clay, some of the long-cell type, with chimneys, and others square with open tops. Both types appeared to give satisfactory results.

Towards the close of the training two sod destructors, one round, the other square, were built for instructional purposes. Each was 2 feet 6 inches wide inside, and 3 feet 6 inches deep, the thickness of the walls being about 12 inches. Each was built by five men in about two hours; but for practical purposes two men, or at most three, would work to better advantage. The square destructor was in use within two and a-quarter hours from the commencement of the work on it, and quickly disposed of a large pile of damp refuse which had been specially saved for it.

So far as could be seen, the sod destructor did its work quite as well as the brick one. Inasmuch as the material for it is generally available on the spot, while the cost of materials and

labour for a brick cell is probably not far short of two pounds, it would seem worth while to adopt the former as the standard type.

The destructor should be built on the site from which the turf has been stripped, so as to minimise the risk of setting fire to the surrounding grass.

The bottoms of the air inlets should slope outward, to facilitate the removal of the ashes.

Vigilance is required to check the waste of good bread and vegetables, large quantities of which are sometimes brought down to the destructors.

(7) *General Observations.*—The conditions met with in different places vary so widely that it would be a mistake to lay down any hard-and-fast rules for camp sanitation; and a wide discretion should always be left to the man on the spot.

The best measures which can be adopted depend absolutely for their success on the intelligent co-operation of all ranks. This co-operation cannot be expected from men who come straight from an environment in which everything is done for them by the civil authorities.

It is therefore of the first importance that every Territorial soldier should be made to realise his responsibility for safeguarding his own health and that of his comrades.

Instruction in elementary hygiene should be included in the ordinary training of every unit; and the rules to be observed in camp should be read out to the men as soon as possible after their arrival on the training ground.

If the sanitation of a camp is to be maintained on a proper basis, it is absolutely necessary that it be started on right lines. Unless strict supervision is exercised at the outset, taps and ablution benches will be placed in hollows, or in situations requiring long drainage gutters through the camp; soakage pits will be dug in close proximity to the kitchens, and latrines sunk too near them, or in the line of the prevailing winds.

Every officer who may be called on to lay out a camp site should therefore be competent to see that sanitary requirements are properly complied with. Until this can be depended on, a sanitary officer should be present at the laying out of every camp.

There are two points of view from which camp sanitation may be regarded, viz., its efficiency in safeguarding the health of the troops under training, and its educational effect in accustoming them to the conditions of active service.

A standing camp, excellent as it is as a health resort, is apt

to be lacking in opportunities for that training in sanitary duties of which the civilian soldier stands so much in need. It would be worth while, at some sacrifice of convenience, to adopt the plan of doing nothing for him which he can be taught to do for himself.

The greatest difficulty occurs with regard to instruction in water duties. It is too much to expect that a brigade should be supplied from a polluted source merely for the sake of instructing the water sections in modes of purification; yet it is most important that this work should be thoroughly taught.

I do not think I shall be accused of being unduly obsessed with the importance of sanitary training. All experience goes to show that the disasters chiefly to be feared in the early stages of a campaign are those which spring from the ignorance of the soldier, and his inability to adjust himself to his new environment. And the distress due to the strangeness or irksomeness of the conditions under which he is placed cannot fail to react on his efficiency as a combatant.

Sanitary instruction is sometimes looked on askance, on the ground that troops fighting for life against a resolute enemy, or exhausted by a succession of forced marches, will have neither time nor strength to attend to matters of the kind.

This criticism misses the essential purpose of sanitary instruction, which is not merely to teach methods, but to inculcate habits. The more arduous the campaign, the more exhausted the troops, the less the time which can be spared for sanitary duties, the graver is the danger to which an army is exposed by the ignorance or carelessness of the men who compose it, and the more important it is that every soldier should instinctively conform to sanitary rules as closely as the exigencies of the situation may permit.

DISCUSSION.

Major CALDWELL SMITH said that he had never known the sides of the trenches which had been cut away to fall in. The men pushed their feet against the turf at the side of the recess. The sod refuse destructor was by far the best all-round arrangement for camps of long or short duration. He found that in clay soils it was best to puddle the urine trenches and not leave them with permeable bottoms.

Captain STRATON said that in the 4th Division they found the latrine trenches were best only 1 foot deep, and with this there was no need to widen the bottom. Urine trenches, they found, were best made 2 feet wide, and it was an improvement to fill in the trench with loose stones or

chalk; such an arrangement kept sweet for a fortnight. The circular incinerator was easiest to clean out.

Major BEVERIDGE asked whether bully beef tins would do as well as salmon tins for drains.

Lieutenant-Colonel MELVILLE said with regard to puddling urine trenches the chief thing to do was to avoid pools, and in a clay soil this would probably be best done by puddling the bottom, making it even.

Lieutenant MARTIN, in reply, said that pools were best avoided in all soils by making the bottom of the urine trenches permeable. He thought men should stand straddle across the trench, and for this the width suggested by Captain Straton was too great.

Clinical and other Notes.

A CASE OF CHOLECYSTECTOMY.

By Major C. G. Spencer.
Royal Army Medical Corps.

The patient, an officer, aged 43, had suffered from seven severe attacks of biliary colic during the previous year. Under chloroform the usual vertical incision through the right rectus was made, and was afterwards extended inwards at its upper end. The patient was stout, and took chloroform badly, hence there was considerable difficulty in getting access to the neck of the gall-bladder, which was somewhat dilated, quite free from adhesions, and contained a large number of stones. The gall-bladder was freed from before backwards, and when it had been cleared as far as the cystic duct great difficulty was found in passing a ligature round the pedicle, and no other form of clamp than an ordinary pair of artery forceps was available. When a ligature was at last tied round the pedicle, and the latter divided, the ligature promptly slipped off, and the stump of the pedicle retracted out of reach. No bleeding or escape of bile followed, and as the pedicle had been well crushed in forceps it was hoped that no leakage would occur from it until the general peritoneal cavity had been shut off by adhesions. A gauze drain was therefore passed down to the region where the stump lay, and was brought out of the upper end of the wound, the rest of the wound being closed. The patient had severe collapse after the operation, and a good deal of pain, but he rallied well, and made a good recovery. There was free escape of bile along the gauze drain on the day after the operation, but no signs of general peritonitis. Bile continued to escape in gradually diminishing amount until the eighth day, the gauze drain having been left untouched for the first forty-eight hours, and removed altogether three days after the operation.

The point of interest in this case was how to deal with the difficulty of securing the pedicle of the gall-bladder. Such a difficulty may occur to any surgeon whose experience of gall-bladder surgery is limited. The method adopted proved successful in this case, but in another similar case I think it would be better to clamp the pedicle with two pairs of artery forceps, divide it between them, and leave the proximal clamp on for forty-eight hours, with a gauze drain alongside it. This would certainly prevent any leakage of bile until all risk of contamination of the peritoneal cavity was over.

A minor point is that in future I should not care to undertake such an operation without having a right-angled pedicle clamp at hand, as the difficulty of tying a ligature beyond the point of a straight clamp at the bottom of a deep wound, especially with the patient taking the anæsthetic badly, is very considerable.

A CASE OF ENTERIC FEVER TREATED BY VACCINATION.

By Major C. E. POLLOCK.
Royal Army Medical Corps.

The patient, an officer, aged 47, had suffered from three attacks of acute inflammation of the connective tissue of the left leg, which were diagnosed as *Peliosus rheumatica*, during the previous fifteen months.

On April 23rd, 1909, he felt particularly well. On April 24th, while at work in his office he was suddenly seized with a rigor and felt extremely ill; he drove home and went to bed where he remained, but did not report sick till April 26th.

His condition then was as follows:—Temperature 104, tongue moist and slightly furred, skin hot and dry, bowels acting naturally and rather freely; he also complained of severe headache. On April 27th, a sample of blood was taken by Lieutenant-Colonel Birt; this failed to give any reaction with *Bacillus typhosus*, *B. paratyphosus* A or B, or with *Micrococcus melitensis*.

On April 29th, Lieutenant-Colonel Birt drew off 6 c.c. of the patient's blood; this yielded a pure culture of *B. typhosus*, from which the vaccine with which the patient was subsequently treated was prepared.

There was practically no change in his symptoms till May 1st, when slight enlargement of the spleen was noted, and his tongue became dry and brown. On May 2nd, he was transferred to the military hospital. His symptoms were considerably aggravated by the journey, and on arrival his condition appeared to be grave. The same afternoon he was given an injection of the vaccine containing 100 million *B. typhosus*.

On May 3rd, the stools were blood-stained, and the patient was very drowsy. The vaccine injection was repeated. During the following two days his condition improved considerably, and the vaccine was repeated each day.

On May 7th, patient passed about 5 oz. of bright blood in the morning, and a condition of mild collapse supervened which, however, passed off again during the day. The vaccine was repeated. May 8th, patient very drowsy. May 9th, patient slightly delirious, and the skin of his back was just beginning to break. The vaccine was given on each of these days as also on the 10th, when the supply failed for two days, but subsequently three more doses were given.

On May 10th, there was a great improvement in his condition, and from then till the 22nd the disease continued to run a mild course. On this date an acute attack of parotitis supervened, and lasted for five days. The subsequent course of the disease was uneventful, convalescence being slow but steady.

The case is interesting on account of the sudden onset, the gravity of the attack in a man of his age, and the steady improvement which set in soon after the vaccine treatment was commenced. When first seen in the military hospital the prognosis appeared to be extremely unfavourable.

IODINE: ITS USE IN MILITARY WORK.

By Major F. J. W. PORTER, D.S.O.
Royal Army Medical Corps.

Judging by what we have seen in the practice of operative surgery during the past year, both at home and abroad, preparation of the skin of operation areas by the old-fashioned methods appears to have been almost entirely superseded by the use of iodine.

Now and then one sees the skin scrubbed with soap and water, and iodine then painted on. This of course is quite wrong; no previous wetting of the skin should be permitted for at least twelve hours before the operation.

Regarding the strength of the solution, 2 or 2½ per cent. is all that is ever necessary, and it does not cause blistering of the skin. It is important to make up the solution with rectified spirit, for as has been pointed out by Mr. Waterhouse, in cases where methylated spirit is used for this purpose, intense conjunctival irritation is caused to the operator and his assistant by the fumes of iodine given off from the skin.



Messrs. Sumner & Co., of Liverpool, have succeeded in putting up in accordance with my suggestion the requisite quantity of iodine and iodide of potassium in a dry form, for making half an ounce or one ounce of tincture of iodine. The glass tube containing the powder is broken off at the file mark, and the contents shaken into a bottle holding a couple of drachms of rectified spirit. The bottle is well shaken and when solution has been effected, the remainder of the spirit is added. If a 2½ per cent. solution is required, double the quantity of spirit is added.

The use of these tubes enables iodine to be carried without risk to instruments, in case of the bottle becoming broken, and what is important, enables a fresh solution to be made, in quantities just sufficient for the sterilization of an ordinary operation area.

They are also very convenient for making watery solutions of iodine for irrigation purposes.

Painting of the suture line has a marked effect in lessening the risk of those small suture abscesses and of ulceration of the skin which so often gives rise to ugly scars in cases which otherwise have healed by primary union.

A SEVERE CASE OF VENEREAL PAPILLOMATA TREATED AND CURED BY X-RAYS.

By Major A. O. B. WROUGHTON.
Royal Army Medical Corps.

Private X. came under my care recently, with a history of soft chancre. From records of his case I found that on admission, his foreskin being very tight had been slit; this disclosed an enormous number of papillomata. The usual caustic treatment was tried, but when I took over the case, there was no material improvement, and the appearance was dreadful.

The whole of the mucous membrane of the foreskin was covered with papillomata so closely packed that they fitted into one another like a mosaic, they overflowed on to the skin of the penis, and also on to the glans. Below the corona glandis, extending downwards three-quarters of an inch was a thick collar of sessile warty growth, which exuded the most offensive secretion. The papillomata varied in size from that of a large pea to a millet seed, and projected from the surface of the organ three-quarters of an inch. The end of the penis resembled in appearance and size a small cauliflower.

Treatment.—For the first fortnight I tried two daily immersions of the penis (each lasting an hour) in a hot solution of perchloride of mercury 1-3000, the parts being carefully dried afterwards, and freely dusted with calomel and oxide of zinc equal parts. This cleaned things up a little, and somewhat reduced the offensive secretion. I then tried touching the parts with the cautery, glacial acetic acid, and saturated alcoholic solution of perchloride of mercury, but practically made no headway. I thought of removing the whole of the foreskin with its load of papillomata, but as they overflowed on to the skin as already mentioned, it would have denuded the penis too much, and would still have left the sessile collar below the corona glandis.

I then decided to try X-rays, and with the kind permission of Lt.-Colonel C. W. Johnson, in charge of the Alexandra Hospital, Cosham, I took the man there. I found the tube I required—one giving a six-inch alternating spark, with three and a half amperes in the primary current.

The man was placed in position, and the abdomen and thighs were completely covered with three layers of thick lead foil, the penis was brought through an opening just large enough for it, and drawn a little downwards, and more layers of lead foil were placed over the proximal part to prevent any rays going through this aperture. The anode was focussed ten inches from the diseased portion.

I gave the man an eight minutes exposure, then waited five days, and repeated the treatment, but giving ten minutes exposure. The third exposure I gave five days later, and for eighteen minutes; after this I gave

him an exposure of fifteen minutes every four days, until he had had seven in all.

I then waited a week and gave the eighth and last, also for fifteen minutes.

Changes Noticed after each Exposure:—After the first: no change. After the second: no change. After the third: the offensive secretion had quite ceased, and some of the large warts were getting hard and dry. After the fourth: most of the growths began to shrivel. After the fifth: several growths fell off, leaving quite a healthy surface beneath, and the sessile growth was shrivelling. After the sixth: half the growths had disappeared. After the seventh: there were only three small papillomata left, at the frænum. After the eighth, and last: these three remaining growths dropped off, leaving the organ absolutely free, and with not even a trace of what had been.

Remarks.—For slight cases, absolute cleanliness and touching with glacial acetic acid are sufficient; for rather more severe cases, snipping off and touching the stumps with the cautery does very well, but for very extensive and severe cases, such as the one described, treatment by X-rays is by far the best and quickest way of curing the condition.

This method of treatment is quite safe, provided a few precautions are taken. These precautions are most important and are as follows:—

(*a*) A not too soft tube, one giving a six-inch alternating spark, with three and a half amperes in the primary current.

(*b*) The anode should not be nearer than ten inches.

(*c*) A preliminary short exposure, with an interval of at least four or five days, to test the patient's susceptibility.

(*d*) All surrounding parts should be covered with many layers of thick lead foil, and for cases where the distal portion of the penis is involved, the organ should be drawn down, and laid on the layers of lead foil covering the thighs and scrotum, several more layers of lead foil placed above the organ, only exposing the diseased area.

"SUJJEE" OR COUNTRY SODA IN LAUNDRY DEPARTMENTS.

By Lieut.-Col. S. WESTCOTT, C.M.G.
Royal Army Medical Corps.

In connection with the housekeeping instinct of officers commanding hospitals in India, which has received so much encouragement lately, it may be of interest to record a source of economy and increased efficiency in the laundry department which I have had under trial during the last nine months.

The alkali commonly used by Dhobies is "sujjee" or country soda, the analysis of which is:—

Moisture, volatile and organic matter, per cent. 21·90, silica 12·000,

iron and alumina 6·600, lime 7·350, magnesia 1·945, carbonic anhydride and H_2S 8·000, sulphuric anhydride 9·860, chloride of sodium 12·285, alkalies (sodium and potassium) 20·060.

The price of sujjee is two annas per pound.

A pure carbonate of soda can be obtained in all bazaars at two to three annas per pound, a fifth quantity of which gives a better result, is equally appreciated by Dhobies, and yields a saving of about fourth-fifths of the customary expenditure.

OSBORNE.

By Colonel R. H. FORMAN.

"Osborne, the gift of King Edward VII. to the Nation, will ever be sacred to the memory of our late beloved Queen Victoria. Here her late Majesty spent no inconsiderable portion of her married life; here, in after years, when the blow of the Prince Consort's death had fallen upon her, she sought solace from her grief; and here, surrounded by all she loved best in the world, she peacefully breathed her last."[1]

The house and estate were the Queen's private property, and under her will they were vested in King Edward for life; he in turn, with the concurrence of King George, and with the generosity so characteristic of him, gave it to the people, stipulating, however, that if it were possible a portion of the house might be set aside as a convalescent home for officers of the Navy and Army. In 1902, by Act of Parliament, King Edward's wishes were carried out.

One has to see Osborne, to live in it for a week or two, to appreciate the munificence of this gift. I question very much if throughout the length and breadth of England any place could be found which would vie with it in beauty and environment, natural and artificial. The superb view from the terrace over copse and dell, with the sea in the background, possesses a charm peculiarly its own, and I can imagine no place where the unfortunate sufferer from the debilitating influences of prolonged tropical service, or the disabilities due to wounds in action, would find more enlivening surroundings. To the eye jaded with the scorched plains of the tropics the very look of the place is a tonic. It is a grey world at the best of times, and in these go-ahead days we are apt to scoff at such things and designate them emotional. Perhaps they are, but perhaps also your hard, common-sense, practical man-of-the-world is not quite so infallible as he would wish us to think, and there may be more in psychic impress than many of us are willing to concede. I for one believe there is, and the older I get the firmer becomes that conviction. We talk glibly in these days of neurasthenia, neuritis and a host of similar vague and undefined ailments; we attribute them to the storm and stress of

[1] "Handbook to Osborne," by A. J. Durrant, M.V.O.

modern life and what not, knowing full well that we are but concealing our ignorance behind phraseology; but though the nomenclature may be specious the reality remains, and Osborne is an ideal spot to dissipate such vapours, if vapours they be. *Tempora mutantur*—the hypochondriasis of yesterday is the neurasthenia of to-day; but I will defy the most confirmed hypochondriac to go out on a bright sunny spring morning at Osborne, with the trees just bursting into leaf, and the thrushes warbling in the dells, and not experience the revivifying influence of the environment. This is why I say that the place, in itself, is a tonic.

A large portion of the building is set apart for the accommodation of convalescent officers, and there is room for five ladies, the wives of sick officers. The accommodation is of the best: dining-rooms, drawing-rooms, lofty and airy bedrooms, smoking-room, music-room capable of being converted into a theatre as it possesses a stage, massage-room, a dark-room for enthusiastic photographers, and even a well-fitted laboratory, available for those of my brother officers whose physical disabilities are powerless to check their scientific zeal. There is an excellent billiard-table, an organ, pianos, pianola, gramophone with scores of records, from Wagner to Harry Lauder, and numerous indoor games. Out-door, there are golf, tennis, croquet and bowls, a motor car, and several yacht clubs which make the convalescent officers honorary members.

Medically, there are massage, various appliances for exercises, electrical treatment of all sorts, Schott's Nauheim treatment, saline and other baths, rest cures and the like. All that is wanted now are a few mineral springs (the nastier the better), with free access to the public, and Vichy or Carlsbad would have to look to its laurels—fashionable invalids would flock here by the hundreds and pay any sum demanded. How like sheep we all are! Here is a place far superior to nine-tenths of the fashionable spas, either in this country or the Continent, and yet the medical officers of the Navy and Army seem to be hardly aware of its existence; at any rate, few of them recommend their patients to come here. Why is this? I candidly confess I do not know. Possibly if the charge were several guineas a day (as a matter of fact, it is half a crown), more value might be set upon it. Even the games are free; you may play billiards from morning to night for nothing, if so minded; they believe also in free libraries, and I quite expect the House Governor, one of these days, to inform me that a beneficent Government proposes to present me with a new set of golf-clubs and a few dozen balls.

With regard to climate, the best times of the year are spring, early summer, and autumn. As a rule, the winters are mild, but cold winds are not uncommon. And this reminds me that the staff in general are firm believers in fresh air: it is a harmless, if somewhat trying craze. Osborne possesses many doors and multitudinous windows; these appear to be always open, and I felt sure that the one sorrow of the Governor's life is, that there are not more. The result is chilly, though healthy;

nobody gets a cold here, which is a sufficient comment on those who are eternally preaching about the danger of draughts. We have nothing else but draughts, and strangely enough, after a few days one gets to like it. All forms of lung disease (tubercle of the lung is not admitted), convalescents from tropical ailments or operations, and neurasthenia cases, do particularly well. The dietary is simple and plain, but excellently cooked, and there is little or no suggestion of "hospital" about the menu. Certain of the convalescents are allowed cream, and it is interesting to note the little dodges by which the subaltern strives to soften the heart of the stern doctor, and get put on the "cream brigade." An amusing incident occurred in this connection on the first night of my arrival. Ignorant as I was of the high status of the cream aristocracy, and seeing a small jug of it placed on the table before a young officer, I promptly reached over and helped myself to about one-half of his succulent perquisite, to the joy of the non-elect at the table, and the chagrin of the bereft one. He was either too polite or too shy to protest. I can only hope that his recovery was not materially retarded.

I think the opinion prevails that, by coming to Osborne, one is subjected to all sorts of irksome restrictions: that one is still in hospital, so to speak, and must conform to the regulations. Naturally, as a great majority of the patients have had a weary experience of hospital, they are at first disinclined to add to that experience, and are chary of coming here. Well, let me assure any man who contemplates asking for admission, that he may disabuse his mind, once for all, of any such fear. There are no restrictions except such as are essential in a given case, and which the patient would be the first to agree to. Short of licence, any man can do just as he likes, and so far as curtailment of liberty is concerned, a man might just as well be in his own house or club. Cheerfulness is the keynote of the whole establishment, and a man must be a misanthrope indeed if he fails to appreciate it and respond to it.

On the back of the Army List the procedure necessary to gain admission is detailed, and officers are told to communicate direct with the Director-Generals, Navy and Army. Now I know it to be a fact that junior officers are somewhat diffident about doing this, and especially if they have to enter into details, such as suitability of case, and so forth. They fear to presume, and they deprecate giving trouble. They need not, as a matter of fact, the officers concerned are only too glad to do anything in their power. However, if anyone has this feeling, or if he requires information on any other point, I am authorised by the House Governor, Colonel Wardrop, to say that he will be pleased to answer any communication made to him, and give any information required.

Lastly, I may say that I arrived home from India far from well, and derived the greatest benefit from my three weeks sojourn at Osborne. The courtesy, kindness and sympathy of the House Governor, Matron, Sisters, and the staff generally, are beyond all praise; I felt as if I were in

my own home, and I am sincerely grateful. My advice to my brother officers is to bear Osborne in mind when they have chronic cases in their charge; they may take my word for it that they could not find a better place from John O'Groats to Land's End.

Travel.

A HOLIDAY ON THE YANGTSE KIANG.

By Captain C. W. HOLDEN.
Royal Army Medical Corps.

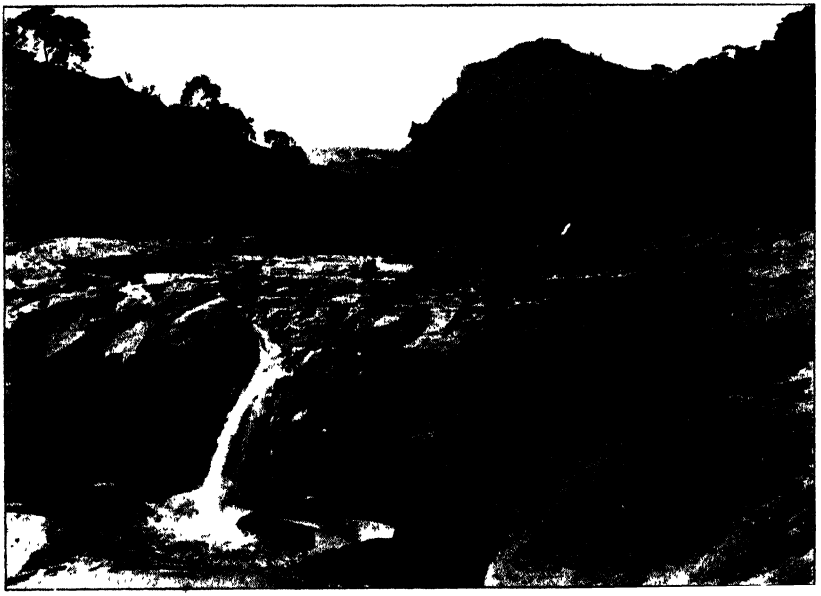
These notes of a holiday on the Yangtse Kiang are written in the hope that they may be useful to brother officers in the Corps serving in Hong Kong, the Straits Settlements, or even in India. I have not attempted any description of the country or people, but have given details as to cost, methods of travelling, &c. Many and good lines of steamships run to Shanghai, which itself is worth a visit. The holiday involves very little "roughing," indeed it has been done frequently by European women, and almost comes within the category of a Cook's tour. The journey of over 1,000 miles through the centre of China cannot fail to be interesting, to say nothing of the magnificent scenery in the gorges. The foreigners resident in China are kindness itself, and help a stranger in every possible way. With an acceptable companion or two I can imagine few more pleasant ways of spending a holiday, either for health or recreation.

The Yangtse gorges extend from Ichang to Kwei fu, about 125 miles. From Shanghai good river steamers run daily to Hankow, and two or three times a week from Hankow to Ichang. Hankow is about 600 miles from the sea, and Ichang another 400, so that steamers of 1,200 tons can travel 1,000 miles up this wonderful river at all times of the year; and during the summer, when the Yangtse is in flood, ocean-going steamers of 8,000 tons can get as far as Hankow.

All the way from Shanghai to Ichang the country is flat and monotonous. The steamer stops for an hour or two at large towns, such at Nanking, Wuhu, Kiu-kiang, &c., not long enough to enable the traveller to do more than take a short walk ashore. But anyone wishing to make a more extended visit to any town may stop and continue his journey by any other steamer, as his ticket

is good for any of the different steamship lines running on the Yangste. The journey from Shanghai to Nanking may be done by rail without extra charge, and some eighteen hours are saved. There is a European hotel at Nanking, but not, I believe, at any of the other towns except at Hankow.

Beyond Ichang there was until lately only one way of ascending the river, by Chinese junk, but now a small steamer is running from Ichang to Chung king. The junks vary in size up to 70 or 80 tons, and can be made very comfortable. Of course on these



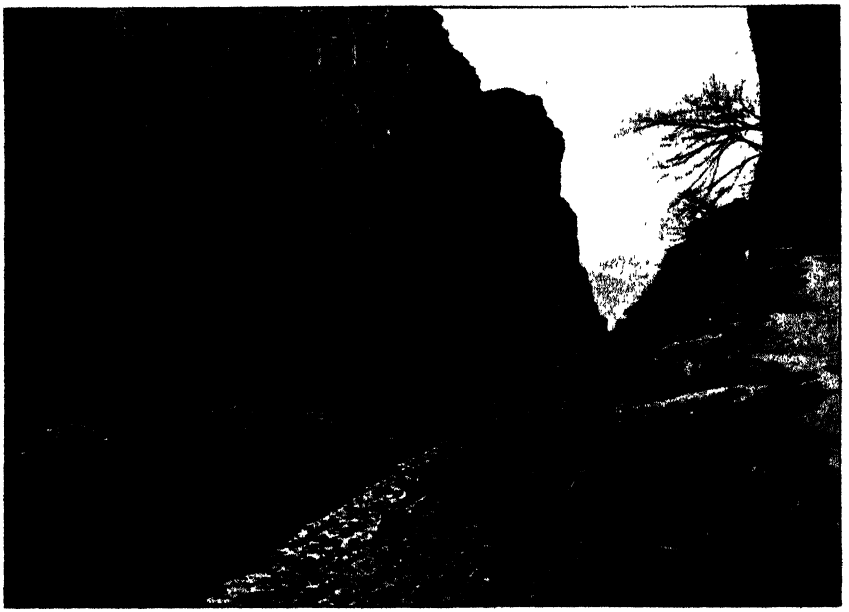
Bridge at Wan-hsien over a tributary of the Yang-tse.

junks it is necessary to have a Chinese servant, bed, bedding, and a certain amount of tinned food. One servant is sufficient for one person, and a good one will act as cook, servant and interpreter, but two people will require a coolie as well. The junk is hired at Ichang, and will cost from $4·00 (about 8s.) a day upwards, according to size. Tea, butter, tinned milk, &c., should be purchased in Shanghai or Hankow; fresh vegetables, eggs, chickens, &c., can be bought at various towns *en route* by the boy, who will not forget to present a bill at the end of the journey.

As already mentioned, a steamer is now running between Ichang

and Chung king, about 400 miles. This is a new venture, and is due to the enterprising energy of an English pilot on the Upper Yangtse. This steamer, which is called the "Shu-tung," and has been built with money subscribed by Chinese in Szechuan province, consists of two parts—a small powerful tug and a house-boat lashed alongside, both having been specially built in England.

The first steamer which ever ascended the rapids did so as lately as 1897, but had to be hauled by coolies a considerable part of the way. In 1900, H.M.S. "Woodcock" and "Woodlark," small



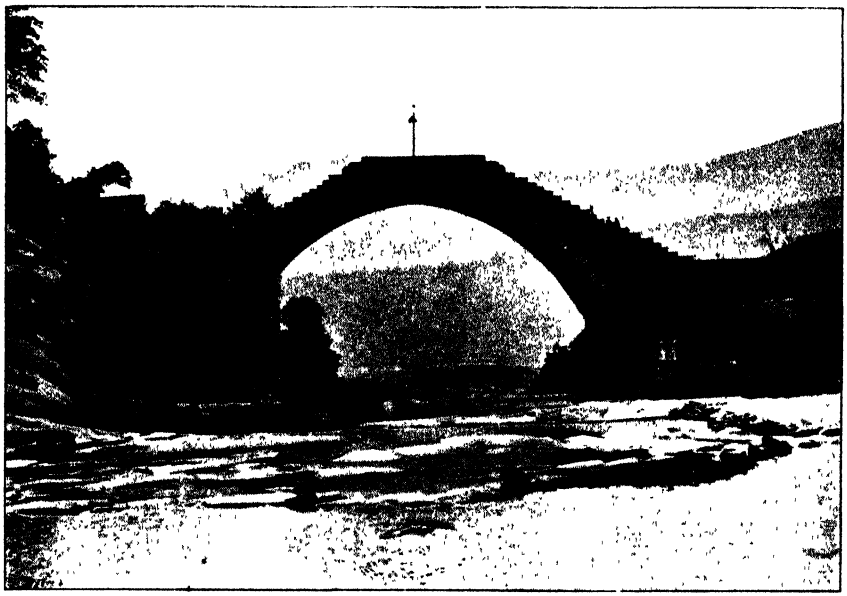
Fung hsang shia—Wind box Gorge.

river gunboats, went from Ichang to Chung king in a month, one of them being badly damaged *en route;* and in the same year a German steamer was lost while trying to ascend. It has been done frequently since then, the record being held at present by H.M.S. "Widgeon," which has done the 400 miles in three and a half days.

I was fortunate enough to find the "Shu-tung" at Ichang preparing to commence her upward journey next morning, and so I had the choice of going up in her or by junk. I decided to go in the "Shu-tung" and to return by junk. I am indebted to Captain Plant, the originator, designer, and pilot of the "Shu-tung," for

much of the pleasure of the trip, and for much of the information contained in this article.

We sailed from Ichang early on April 22nd, and reached the entrance to the first, or Ichang, gorge in about an hour. From here till one emerges from the Kwei-fu gorge, 120 miles, the Yangtse is a succession of gorges and rapids. The mud-coloured waters vary from 500 to 100 yards in width; and to one unaccustomed to the sight, the "white horses" thrown up when the wind is strong look curious against the chocolate-coloured river water. The cliffs and

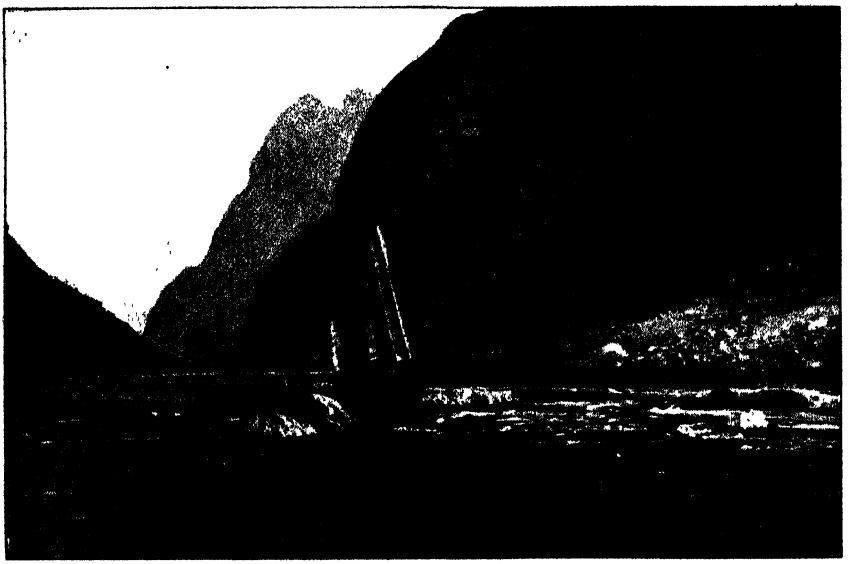


Pa hsua chi—bridge over a tributary of the Yang-tse.

hills run up to an immense height. In places they are hollowed out into caves; in others chocolate-coloured water pours over them from some mountain stream, forming waterfalls. Maidenhair ferns, bracken, dog-roses, azaleas, and other flowers which I did not recognize, grow on hill and cliff. Wherever possible the thrifty Chinese have terraced the hills, and grow peas, beans, &c., on the miniature fields so formed.

The rapids are more often caused by a narrowing of the Yangtse's bed than by an actual fall in its level; although at one of the worst rapids, the "Yeh-tan," both factors contribute. A mountain torrent

here joins the Yangtse, and it has swept down and deposited in the river-bed an immense amount of gravel and rock, forming a dam across two-thirds of it. The available passage at low water is about 100 yards wide, but when the Yangtse is in flood the water rises over the barrier, and the rapid disappears. There is a difference of 60 feet and more between flood and low-water levels in the Yangtse. At this rapid, the "Yeh-tan," the current was too strong for the "Shu-tung." After an abortive attempt to steam up she had to drift back to quieter waters. A 1½-inch wire cable was then



Hsin-tam Rapid with a junk on the rocks.

made fast to rocks above the rapids and its length held clear of the rocks along the side of the rapid by dozens of naked coolies. The "Shu-tung" steamed up, and the end of the cable was taken on board and wound round the steam capstan. With propeller and capstan working hard, the little steamer was being slowly got over when the cable broke, and she again drifted back. So then all the cargo had to be unshipped and carried round the rapid by coolies; another cable was made fast as before and the manœuvre repeated, this time successfully.

The delay at this rapid gave one time to watch junks being hauled over. Long towing-ropes are tied to the junk's mast. These

ropes are made of long strips of bamboo plaited together, and there may be two or three of them, according to the size and weight of the junk. To the shore end of each rope forty or fifty Chinese—men, women, and children—attach themselves. Each coolie has his own piece of fibre rope a yard or two long, one end of which is fastened to a cloth band which goes over his shoulders and the other has a large knot on it. This end is fastened to the thick bamboo cable by wetting it, giving it one turn round the cable and then round over the knot. The coolie then turns his back on the junk and hauls for all he is worth. The whole, with the thick cable up the centre, and the line of twenty-five doubled up coolies on each side and a few feet from it, looks like an enormous centipede.

Each centipede has a gang-master, an old man who, with a small whip, sees that each coolie does his fair share of work. And so, with coolies singing and fireworks being let off to scare away the dragons, the junk is hauled up foot by foot. Sometimes only three or four junks can be hauled over the "yeh-tan" rapid, which is only three or four hundred yards long, in a day, and often there are a dozen or more in waiting. Should ropes break during an ascent, and the junk escape destruction, it must take its place at the end of the queue, and wait till its turn comes round again.

At the foot of all dangerous rapids one or more "red-boats" are always stationed. These are small, strongly built boats, painted red, and manned by four or five sturdy rowers. They go to the assistance of any junks which may be wrecked and save many lives in the course of a year.

The "Shu-tung" reached Kwei-fu during the afternoon of the third day, and I left her there and prepared to descend by a Chinese boat. After some bargaining a skipper contracted to carry me, my servant and effects to Ichang for about 18s. For this he was to find a boat and five rowers. I had a camp bed, bedding, cooking utensils, food, &c., with me, and my food was cooked in the boat over a charcoal stove which I bought at Kwei-fu. The return trip was made in two days, but was not as interesting as the outward journey. Descending a rapid is not as exciting as ascending one, and as the water is moving in the same direction and almost as fast as the boat, much of the sensation of speed is lost. It is only by watching some point on shore that one realises the speed at which the boat is travelling.

At Ichang civilisation and river steamers are again reached. The time required for the whole trip is as follows: Shanghai to Ichang, eight days; Ichang to Shanghai, seven days. The time

spent in the gorges may vary from two or three days up to fourteen or more. So that a four weeks' holiday from Shanghai will allow of at least twelve days being spent in the gorges.

The cost is roughly as follows: Steamer from Shanghai to Ichang and return, £12. The cost of the junk will vary with its size—about 10s. a day for a medium-sized junk capable of accommodating two people and servants. This amount will cover all expenses of crew and extra coolies at the rapids. A servant, if obtained in Shanghai, will cost about 35s. for twenty-eight days, and he is carried free on the river steamers. Dollars and cents are the currency of the country, and as several different provinces are passed through, Mexican or Hong Kong dollars should be taken. Each province in China mints its own dollars, which will not be taken in any other province except at a heavy discount. The value of the dollar varies from time to time; at present it is worth about 1s. 10d. The total expenses should not exceed £25 for one month, and less if two people or more are travelling together.

I can give little information about the shooting to be had. In the spring and autumn immense quantities of duck, teal, geese and snipe pass across the Yangtse valley. The common pheasant is found in many places, and here and there Reeves' and Lady Amherst pheasants.

The trip cannot be made during June, July, August and September, I believe, as the river is then in flood. It would not be enjoyable during the winter months owing to the cold, so that it should be done during the spring or autumn. During these seasons, clothing suitable for an English summer will be necessary, and the traveller may experience a fair number of rainy days.

Reports.

IN BESIEGED PORT ARTHUR (ВЪ ОСАЖДЕННОМЪ ПОРТЪ-АРТУРѢ)[1]

By Major G. S. McLOUGHLIN, D.S.O.
Royal Army Medical Corps.

The author of this work is a medical official of the Russian Army who held the post of Specialist Surgeon to the 3rd Siberian Army Corps.

The general interest of the work is largely contained in the first chapter in which is given a narrative of Russian military operations in the Kuan-tung peninsula. The geography of Port Arthur is roughly but clearly described to an extent sufficient for the purpose of demonstrating the particulars in which, at the commencement of the Japanese War, the fortress was unfitted for defence.

The special qualifications of the old Chinese town as a place of origin and as a centre for dissemination of infectious disease, are described at length, and the necessarily unsatisfactory measures of civic hygienic policy taken by the sanitary executive committee of the Kuantung district are mentioned. Details are given here and elsewhere regarding the water and food supply.

The railway, being largely monopolised for the supply of warlike material, was practically not available for the purpose of causing the food supply to be augmented in those respects in which it was unsatisfactory both as regards quantity and quality, and as regards certain materials necessary for the preservation of health during a prolonged siege.

The amount of labour required to place Port Arthur in a condition suitable from a sanitary point of view for prolonged defence was not available owing to the more pressing necessity for the completion, as far as possible, of the defence works.

On the outbreak of hostilities the Coast Defences were more or less completed; these consisted of twenty-two batteries, of which nine were of ancient type and devoid of concrete. The total number of guns mounted was 122, of which five were 10-inch guns of long range. On the other hand, as regards the land defences, about two-thirds of the designed fortification was non-existent. On the West Flank, Angle Hill (174 Metre Hill), High Hill (203 Metre Hill), and the vicinity of Pigeon Bay, were entirely unfortified, as were also the advanced positions, Ta-ku Shan, Hsiao-ku Shan, Division Hill, and "Polun Shan." Of the forts included in the original Russian plan of the fortress, one was complete, three were incomplete ("traced out in the rough"), and two non-existent. Of the five "fortifications" (intermediate works designed later to fill the intervals) only two were complete. Of five permanent batteries (designed for some of the intervals), only two were complete.

[1] By V. B. Gyubbenet. 406 *pp. with* 2 *maps*, 10¾ × 7½ *inches. St. Petersburg*, 1910.

For the first three months Chinese labourers, to the number of as many as 7,000, worked daily at the construction of the defences; afterwards the Chinese fled in masses on account of the approach of the Japanese. The 7th East Siberian Rifle Division continued to carry on the work, labouring day and night. After five months' work, towards the end of June, the forts, fortifications, and batteries were finished, as also the lines of entrenchments and ninety-two "temporary" batteries. It was possible to arm the works, because the old Chinese arsenal contained a large number of guns and shells; the latter were specially unsatisfactory.

It is stated that the total armament mounted in all works consisted of 525 guns and 29 machine guns.

In April, 1904, the troops in Port Arthur consisted of the 7th East Siberian Rifle Division (the 25th, 26th, 27th, and 28th East Siberian Rifles) the 15th East Siberian Rifle Regiment (belonging to the 4th East Siberian Rifle Division), two Depôt Battalions, one Brigade of Field Artillery, three Battalions of Fortress Artillery, a Mining Company, a Telegraph Company, a Sapper Company, a Company of Frontier Guards, and a Squadron of Trans-Baikal Cossacks (1st Verkhne-Udinsk Cossack Regiment).

The force commanded by Major-General Fok (under Lieutenant-General Stessel, the Commander of the Fortified Zone) consisted of four Rifle Regiments (the 13th, 14th, and 16th East Siberian Rifles of the 4th East Siberian Rifle Division, with the 5th East Siberian Rifles less one company), one Artillery Brigade and one Depôt Battalion. Each rifle regiment comprised three battalions.

The total numerical strength of the above-mentioned units was 41,600 combatants and non-combatants, not including officers and officials; in this total is included 13,000 men under Major-General Fok.

In preparation for the siege thirteen companies (2,500 men) of auxiliary troops were formed from among the inhabitants of the town and the Port labourers.

Counting in the shore detachments of the Fleet, with a numerical strength of 3,500, the total strength of the Russian Force in the Peninsula is assessed as 47,000 men.

The author, in giving details regarding the supplies of food available to feed this number of men, mentions the measures taken to provide for the supply of fresh meat during the investment and the reasons for want of success in the attainment of the object. Much stress is laid on this matter in order to show the impossibility of averting the outbreak of scurvy which contributed so greatly to the weakening of the garrison. Elsewhere are given reasons why vegetables, &c., in sufficient quantity were not available.

In the descriptions of the actions preliminary to the investment and the military operations of the garrison of Port Arthur, but little is added

to the information already available; in a sketch such as the author presents a continuous account complete in minor detail could not be expected, but it may be remarked that the author has evidently the gift of concise and clear description and of keeping his purpose in view. He avoids the tendency to over-estimate the losses of an enemy.

Such figures as he gives regarding casualties in the Russian Forces are certainly of historical value; he affords in later chapters, by his statistics of work done in dressing stations and hospitals, some means of checking these figures and of forming by consideration of "internal evidence" an opinion as to general reliability.

The losses in the first action near Shih-san-li-tai on May 16th are given as 2 officers and 18 men killed; 9 officers (including Major-General Nadyein) and 158 men wounded. The 3rd Battery of the 4th Artillery Brigade is stated to have lost all its officers and 70 per cent. of other ranks and 12 horses.

Mention is made of an action at Mount Samson on May 18th in which a scout detachment of 130 men was engaged, this detachment suffered a loss of 31 killed and wounded, and retired to Chin-chou (probably Nan Shan is meant).

The defence of the town of Chin-chou does not receive special mention. Probably the losses incurred are included in the total given for the battle of Nan Shan which are stated to have been 26 officers and 1,644 men; the respective numbers of killed and wounded are not given, but it is specially stated that the number of killed was nearly equal to the number of wounded.

Considering the conditions under which the defending force fought, this statement appears entirely credible and in accordance with former experience. The greater part of the loss is stated to have been incurred during the retirement: this statement, however, inherently probable, is not entirely borne out by the detailed account of the experiences of medical *personnel* and stretcher bearers.

The author describes the ill-effects produced by the series of disasters by land and sea on the spirits of the inhabitants of Port Arthur, who were apparently well aware of the deficiencies of supplies and stores. That the outlook was not without effect on the *moral* of the garrison is indicated by the fact that in May and June 5 officers and 9 men committed suicide.

It is stated that the "position of the passes," occupied by the Russians after the battle of Nan Shan, was held by eleven battalions, nineteen Scout detachments (of which five detachments were mounted), with 24 guns; and that in addition, the general reserve consisted of $5\frac{3}{4}$ battalions with 32 quick-firing guns.

The Japanese attack on June 26th (resulting in the capture of Chien-Shan) caused the Russians a loss of 26 men killed and 8 officers and 95 men wounded.

The attempt to retake Chien-Shan on July 3rd and 4th, was made with three battalions of the 7th East Siberian Rifle Division and three battalions of the 13th and 14th East Siberian Rifle Regiments (belonging to the 4th East Siberian Rifle Division).

On these dates the 4th East Siberian Rifle Division lost 1 officer and 47 men killed, 9 officers and 283 men wounded; the 7th East Siberian Rifle Division lost 1 officer and 55 men killed, 8 officers and 312 men wounded. In addition, about 300 slightly wounded men remained in the ranks. The point that the latter are not counted as losses is worthy of note.

Certain unsuccessful attempts made, about this time, by the Japanese to undermine the military spirit of the Russian troops, are commented on.

At this period in spite of heat, heavy rains, and hard work the health of the troops was fairly satisfactory; outbreaks of epidemic disease had been averted by strict supervision and discipline. Hot meals, tea and boiled water were issued at the positions; the Lun-Ho, swollen by the rains, afforded facilities for bathing.

The defence of the "position of the passes" during the fighting on July 26th, 27th and 28th (resulting in the loss of the position) cost the 4th East Siberian Rifle Division 4 officers and 135 men killed, 17 officers and 827 men wounded; the 7th East Siberian Rifle Division lost 3 officers and 113 men killed, 18 officers and 908 men wounded.

The Russians, having fallen back to their last line of defence outside the permanent fortifications, were attacked in their unprepared positions on July 30th, with the result that the whole line was evacuated with the exception of Ta-ku Shan and Hsiao-ku Shan. The Russian losses on this day were 2 officers and 150 men killed, 10 officers and 448 men wounded, 1 officer and 93 men missing.

On August 7th, the land bombardment of Port Arthur began, causing a few casualties in the town, and the assault on Ta-ku Shan and Hsiao-ku Shan commenced. The defence of these positions (which continued till August 9th) cost the two battalions (of the 16th East Siberian Rifle Regiment) employed 22 per cent. of their *personnel*; exact figures are not given; it is noted that only 10 per cent. of the 10th Company were brought out of action. On the retirement from Ta-ku Shan the stretcher bearers could not bring all the wounded out of action, on account of the Japanese fire; some of the wounded crept in next day.

The attempt, on August 9th, to recapture the damaged guns abandoned on Ta-ku Shan is not mentioned.

Regarding the defence of the Western Hills against the Japanese attack (a movement preliminary to the first general assault) the author gives an account which does not readily fit in with other narratives. The Russian losses on August 15th, 17th and 18th are stated to have been 2 officers and 171 men killed, 6 officers and 1,280 men wounded.

The account of defensive operations during the siege cannot be

regarded as of much historical value, continuity of detail being lacking. The losses for the months (according to the old style) of August, September, October and November, are given.

In August (old style) the total casualties amounted to 128 officers and 8,175 men, including 34 officers and 1,428 men killed.

In September (old style), 11 officers and 437 men were killed, 48 officers and 2,589 men wounded.

In October (old style) the garrison lost 18 officers and 677 men killed, 81 officers and 3,753 men wounded; at the beginning of this period the number of men under arms is stated to have scarcely amounted to 20,000. To repulse the second general assault, as well as the Naval detachment, auxiliary troops (town guard) and men recalled from various non-combatant duties were actively employed in the defence.

Disclaiming ironical intention, the author states that the only reinforcements available were the sick and wounded in the hospitals, from which, apparently, were discharged all men in any way fit to fight. The hospitals were later to furnish other reinforcements; in the beginning of December their non-combatant detachments furnished a body of 600 men who, having received rifles, were moved off to High Hill; 12 per cent of these "remained for ever on High Hill," and in the space of two days 75 per cent. returned, wounded, to the hospital.

There is something to be said for the principle that the non-combatants of an Army should be able effectively to change their *rôle* in case of necessity. It is to be hoped that in the present day no one will consider the Geneva Convention infringed by an order such as that under which the last-mentioned reinforcement was furnished.

On December 4th the right flank of the defence was so denuded of men that 120 sick men who could still keep on their legs were turned out of a Reserve Field Hospital and despatched to Krestovaya Hill.

From November 14th to December 13th the total losses were 155 officers and 6,586 men; of these 38 officers and 1,198 men were killed. In the repulse of the third general assault about 1,350 men were wounded, the greater part of the remainder of the wounded received their wounds in the fighting on High Hill (203 Metre Hill).

The author, after referring to the general damage done to hospitals during the Japanese bombardments and demonstrating carefully that this result could only be considered as inevitable, makes, however, a definite statement to the effect that the destruction of hospital buildings in New Town after the capture of High Hill by the Japanese (which gave full opportunity for observation and correction of Artillery fire) was clearly intentional. The object of this procedure was, he surmises, to establish a moral effect.

The remonstrance of General Stössel was unsuccessful; the author quotes Moltke's views on conventions and clearly appreciates the precise value of international conventions to a belligerent who is not in a position to enforce observance of terms.

The negotiations with reference to the destruction of hospitals had one result, that several thousand letters for the garrison were handed over by the Japanese, an act which the author notes as being one of extraordinary kindness (others have not invariably considered benevolence to be the sole motive). In return, Japanese prisoners were given facilities for epistolary communication with their friends.

An account is given of the circumstances under which Major-General Kondratenko was killed, with an appreciation of his work and of the disastrous loss to the garrison occasioned by his death.

The explosions in the forts during the latter days of December appear to have been extremely severe in their effects. The explosion in Fort No. 2 (Fort Chi-kuan) left only 17 men alive. The whole garrison of Fort No. 3 (Fort Erh-lung), more than 140 men, was destroyed by the explosion on December 28th. In "Fortification" No. 3 (Fort Sung-shu) on December 31st after the explosion only 160 men remained alive, a few of whom got back by night, the remainder being killed or taken prisoners.

On January 1st, 1905, in resisting the Japanese assault on Eagle's Nest the whole garrison of this work was destroyed, except three riflemen who retired. The capture of this height laid the Old Town directly open to the Japanese.

At the time of the capitulation Port Arthur was merely one great hospital; in thirty-nine buildings, more or less damaged by bombardment, were collected 13,776 sick and wounded; nearly all the men counted as still able to fight were actually incapacitated by scurvy. They should have been in the hospitals, but the overcrowded state of these would alone have prevented admission.

As no one wished to remain behind his comrades, 23,131 men (not including officers or officials, but including 5,813 men of the naval detachments) paraded at the collecting point to be taken over as prisoners. Many of these were so weak that they could scarcely keep on their legs. About 40 men had died in attempting to reach the collecting point. About 1,468 soldiers were so exhausted that the Japanese medical authorities decided that these could not proceed without danger to their lives, and they were accordingly returned to Port Arthur.

The author calculates that the number of men (not counting officers) of the land forces sent on as prisoners amounted to 15,810, of whom 12,400 belonged to Infantry units, and 3,410 to Artillery units. Non-combatants are included in these figures. On p. 390 he quotes figures taken from an article in the *Russki Invalid*, which appear to be more correct.

An account is given of the organisation of the medical service, commencing with a narrative of the formation of the 3rd Siberian Army Corps (in which were included the 3rd, 4th and 9th East Siberian Rifle Divisions with Artillery and Cavalry) and the manner in which this Army Corps

was broken up. The medical service shared in the general disadvantages resulting from the needless complications of the organisation of the forces in the Kuan-tung peninsula.

The Administrative Medical Officer of the 3rd Siberian Corps was, by an order dated May 9th, appointed director of medical services in the Fortified Zone. In the same order the Administrative Medical Officer or "Medical Inspector" of the fortress (who was, of course, directly under the orders of the Fortress Commandant), was placed under the orders of the newly-appointed director.

The duties of "Inspector of Hospitals" were at first carried out by the Chief of the Staff of the 7th East Siberian Rifle Division, Lieutenant-Colonel Naumenko of the General Staff, but, as the other duties of this officer were onerous, Major-General Tserpitski (commanding 1st Brigade of the 1st East Siberian Division) took up the post in May or June. After the death from wounds of this Commander on December 7th, this appointment also was filled by the Administrative Medical Officer of the 3rd Siberian Corps. Having in view the fact that the duties of an "Inspector of Hospitals" are varied and important (they are by no means sufficiently indicated by the designation of his appointment), it seems unnecessary to comment on the object lesson afforded.

With regard to the posts in Russian field hospitals, which are ordinarily filled by combatant officers or non-medical officials (as overseers, assistant overseers, and secretaries), it is noted that these posts were practically always actually filled by feldshers (surgeon's mates) of official rank, or in some cases by wounded officers. However, one officer (a captain) acted as overseer in a hospital throughout the siege.

The number of medical officials of all ranks, with the land forces, amounted to ninety-seven (including four belonging to the civil administration), forty-one of these being on the establishment of combatant units. The author demonstrates that this total number was altogether insufficient, even for the care of sick and wounded alone; as none but the most serious cases could be admitted to hospital (or spared from their units), an unusually large share of work fell to the regimental surgeons. There were 294 feldshers of all classes, including 180 on the establishment of combatant units; their courageous devotion to duty is commented upon, as also, elsewhere, their losses in action.

The "hospital detachments" comprised, at the commencement of the siege, a total number of about 900 men. This number was later increased, but about two-thirds were finally taken for combatant duty. They were replaced by 276 men, some of these being locally raised militia ("town guard"), the remainder invalids from the "convalescent detachments." Even before this procedure was carried out, the number of men on hospital duty was considered insufficient.

The 4th East Siberian Division, being a field force, was, on mobilisation, provided with a divisional train, of which the "medical section"

consisted of a divisional lazaret and two divisional mobile field hospitals. Apparently only one of the divisional hospitals was actually used in its special rôle, which is to clear the field ambulances. The transport of the divisional field ambulance consisted of fifty-six carts with seventy horses; in respect of horse transport it would appear that the unit was something of a makeshift; the stretcher company was complete.

The 7th East Siberian Division was not mobilised for field operations, and was not provided with a divisional train; the only medical formation in this division was the regimental lazaret.

Of the two mobile field hospitals above mentioned, one (No. 5) was eventually established in barracks on the Tiger Peninsula, being opened there on June 30th with 650 beds, to which 150 were added later. The other (No. 6) mobile field hospital was eventually established in houses in New Town, being opened with 210 beds on May 28th; the number of beds was later increased to 300, and eventually to 650.

There were in Port Arthur seven "reserve" field hospitals (units normally equipped for 210 beds each, and analogous to the stationary hospitals of the British Service), numbered respectively from 5 to 11.

No. 5 was established in barracks in rear of No. 18 shore battery; it was open before the commencement of hostilities: eventually the number of beds was raised to 320.

No. 6 was established in the District Headquarters Buildings in New Town, being opened on June 9th with 260 beds, which number was later increased to 420.

No. 7 was established in the buildings of a Government School, and opened on June 10th with 260 beds, which number was later increased to 310.

No. 8 took over the buildings of the Port Arthur town hospital, being opened on June 9th with 210 beds, later increased (by the occupation of barracks) to 400.

No. 9 was established in a hotel and house in New Town, and opened soon after the commencement of hostilities with 260 beds (including 60 for officers), which number was later increased to 360. The buildings occupied having been wrecked by 11-inch and 6-inch shells on December 14th and 15th this unit ceased to exist.

No. 10 was established in the Municipal Hotel buildings in New Town and opened on July 5th. The number of beds was later increased to 300, and eventually to 420.

No. 11 was established in Naval Barracks on the Tiger Peninsula, with 1,200 beds, and opened on September 19th as a special hospital for epidemic diseases (enteric fever, dysentery and scurvy).

The "massed field hospital of Port Arthur" was to all intents and purposes the general garrison hospital used in time of peace. According to a regulated method, two or three field hospitals may be conjoined or "massed" to form one unit which receives a designation indicative of

the locality in which it is established. In this case two field hospitals had been so conjoined, and consequently the number of beds was 420. The hospital was established in buildings on the eastern slope at Quail Hill: the technical equipment and internal organisation were in accordance with the manifold requirements of modern science. The number of beds was eventually increased to 1,000.

The "field dispensary," or unit for the supply of all technical material for the medical service, was established in the immediate vicinity of the Massed Hospital.

The supply of dressing material, though very large in proportion to the strength of the force, proved insufficient, and improvisation was necessary; the supply of medicaments was barely sufficient. As cutlers were not available, the usual workshop for which skilled labour is hired could not be established, and consequently instruments rendered useless by wear and tear were not replaced in sufficient quantity, greatly to the detriment of surgical work.

The Naval Hospital originally had 200 beds, the number of beds was eventually raised to 1,400. The Hospital ship "Kazan" belonged to the Navy. The port hospital had 50 beds. The Red Cross Society had 310 beds in the Mariinskaya Hospital, besides 200 in the hospital (Dalninskaya), brought in from Dalny. The Red Cross Society also helped the Military Medical Service according to its recognised methods by the supply of *personnel* and material; notably in respect to the latter by improvisation and local purchase.

The Society's hospital ship "Mongoliya" had 160 beds, a number eventually raised to 300. There was a railway hospital of 100 beds which also received sick and wounded from the troops.

There were no permanent ambulance trains in the peninsula, or indeed any railway carriages fitted up for the transport of sick and wounded in the authorised manner. From May 13th to 26th, wounded were brought into Port Arthur in ordinary goods wagons, on the floors of which straw and mattresses had been laid, but this rough improvisation could not always be effected even for the transport of severely wounded men. From six to eight men lay in each wagon. Each train dispatched from Port Arthur carried a supply of technical medical material and *personnel*, including a surgeon, for duty on the train.

A feature of the evacuation by rail of the wounded from the battle of Nan-Shan was the omission to supply a sufficiently large amount of food for the wounded.

The Red Cross Society set itself to work to fit out an improvised ambulance train by means of its own workshops; certain goods wagons were cleaned and painted (as to interior) with white oil paint, hooks were fixed to the roofs, to carry rope loops for the suspension of stretchers, four to each wagon. On the floor of each wagon were laid mattresses for six slightly wounded men. The train consisted of nine of these

wagons for wounded, with a mail wagon fitted up for use as a dispensary, dressing-room, kitchen, and for the accommodation of *personnel*. This improvised ambulance train made many journeys and brought into Port Arthur more than 1,000 wounded. The most unsatisfactory point about the train was that the weight of the wounded did not sufficiently effect the resistance of the springs of the goods wagons.

The improvisation of road convoys of wounded was a marked feature of medical organisation. Various kinds of wagons and carts, hackney carriages, rickshaws and cycle stretchers were all used in the transport of wounded. The heavy springless carts were unsatisfactory on the hilly ground and bad roads. The hackney carriage (barouche or victoria), drawn by two small horses and driven by a Chinaman, was more satisfactory, but only two wounded men could be carried by each. About seventy of these carriages were used during the fighting at the Green Hills. One of the drivers, obviously a spy, managed to drive over to the Japanese "in sight of everyone."

There were about sixty rickshaws in Port Arthur; these conveyances were well adapted for the conveyance of wounded who could sit up, two men being carried in each rickshaw. Each rickshaw was pulled by two Chinamen, who were paid at the rate of half a rouble (rather more than a shilling) to each coolie for every wounded man brought to the hospital during the investment. In the early part of the siege the rickshaw men were very keen, but later they could not be persuaded to continue work.

The Naval Medical Service had about thirty rickshaws which had been specially fitted in the Naval workshops to carry stretchers; this was a great improvement.

Twelve contrivances for carrying a stretcher on bicycles were fitted up and used by a cycle detachment, organised by an officer of the garrison from sixty-two volunteers from the civil population. Each stretcher was carried on two bicycles connected together. As a means for transport of wounded under the circumstances of the siege, these contrivances received approval, and the detachment did a great deal of work.

As regards field ambulance work, the regulated number of stretchers appears, though great, to have been insufficient. A Fortified Zone order of July 9th directed that the number of stretchers be doubled. Under the circumstances soldiers other than the duly appointed stretcher-bearers were taken away from their primarily important duties to carry wounded. This practice could not of course be continued, and finally a later order relegated the stretcher work to volunteer militia and to Chinese coolies, who were allotted, in numbers from 50 to 100, to each dressing station in the fortress.

The details of field ambulance work are naturally of limited interest in that the experience of defensive military operations only is dealt with. The definition of the Russian method in the selection of the site for ad-

vanced or regimental dressing stations is interesting. The *raion* (zone or area of work) of the dressing station is laid down by the Regimental Commander, the site of the dressing station is selected by the senior surgeon in charge of the regimental lazaret (field ambulance). The extreme distance of the dressing station from the firing line is given as from 2 to 2½ versts (1⅛ to 1⅝ miles).

At the battle of Nan-Shan, for each company of the defending regiment a small dressing station was formed, under the company feldsher: these stations were established in blindages (covered trenches). In the centre of the position, behind the central redoubt, was established the regimental dressing station, where the regimental surgeons worked. This site was exposed to the heavy artillery fire of the enemy, and in a short time about forty stretcher-bearers, carrying wounded, were killed or wounded at this point alone. A retirement a short distance to the rear was carried out and the dressing station re-established in a cleft among hillocks. But shrapnel fire caused a further retirement to the railway station at Ta-fang-Shen. In this place the remainder of the work was completed by the evening, still under artillery fire which killed about ten of the wounded and caused further injuries to several others. The wounded were sent off by rail; about 430 of these, having received all necessary attention, were sent direct to hospitals, the remainder were sent to the divisional field ambulance at Nan-kuan-ling.

The regimental dressing stations at the "position of the passes" and the Green Hills were carefully selected in the light of recent experience. Each was near one of the three roads leading to Port Arthur and situated from 1⅛ to 1⅝ miles in rear of the fighting line.

The main or divisional dressing stations are normally formed by the divisional field ambulances; for the 7th division (which had no divisional field ambulance) an improvised main dressing station was formed; the medical *personnel* of this was taken from the 25th and 28th Regiments. This dressing station was at "Pajduztsi." The divisional lazaret of the 4th Division was at "Vandzyadenzi."

The committee which in time of peace had organised plans for the defence of the fortress had never taken into account the necessity for the provision of places suitable for dressing stations within the fortress. To settle this and other allied questions of medical organisation, by a Fortified Zone order of June 18th, a committee was formed with Major-General Kostenko as President and, as members, the Administrative Medical Officers of the Army Corps and of the Fortress, with other medical officials representing the Army, Navy, Port Authorities and the Red Cross Society. With commendable promptitude this committee carried out its work, choosing sites, arranging for adaptation as dressing stations, allotting to each station *personnel*, material and transport, defining areas and units from which wounded were to be collected at each station and routes for clearance to individual hospitals.

In commenting on the work of the medical service in action, the author points out the good effect which the obvious presence of effective means for the prompt rendering of medical aid has on the moral of the combatant and the necessity for incurring casualties in the medical service if the medical work is to be prompt and efficient.

He practically defends the Japanese against certain charges of killing the Russian wounded, being of opinion that though such killing did actually occur, it was necessitated by the resolute courage of individual wounded men who continued fighting to the last.

As to other charges of active ill-treatment of wounded, evidence collected by him is against these charges, except in one particular; the Japanese practice was to remove the boots of the wounded (as well as of the dead) Russians who fell into their hands.

The prevention by the Japanese (by fire and by the aid of searchlights at night) of stretcher work after an action, even though thousands of their own wounded might lie for days in front of the Russian forts, is the subject of comment in more than one place in the narrative. An order issued by General Kondratenko is quoted; it appears to be considered that such action can only be regarded as involved in the practical application of the correct sentiment regarding the preferability of death to capture. That the Japanese did not invariably regard in this manner the individual interests of their wounded is well known and appears in the narrative.

The distinguishing lantern of Russian medical formations is stated to have a red cross marked on the glass (otherwise presumably uncoloured). It would not appear that, from a distance, this distinguishing lantern would be readily recognisable.

The surgical history, which occupies about 144 pages of the work, is full of detail most ably presented. A description is given of the Arisaka and Murata rifles and ammunition and of the wounding effect of small arm projectiles under various conditions. Artillery projectiles and grenades and their effect on human tissues are also discussed.

There are given many hospital statistics which are carefully prepared and interesting to military medical officers.

In the last chapter at the end of the work certain general tables and calculations of losses are presented which are of more general interest. The strength of the land garrison is, for the purpose of calculating percentages, considered as represented by the figure 42,000. The figures are given from the 14th May till the 27th December; the losses from this period till the date of capitulation are not known.

One hundred and forty-nine officers and 5,394 men were killed.

Of the wounded 448 officers and 20,249 men were admitted to hospital, 67 officers and 3,896 men remained at duty.

Sixteen officers and 1,087 men were missing (practically all these are to be counted as killed).

The total Russian loss in killed, wounded and missing amounted to 680 officers, 30,626 men. The loss amounted to 75·5 per cent of the officers (including acting ensigns) and 72·8 per cent of other ranks.

The following percentages are calculated on actual strengths of 14th May.

The 4th East Siberian Rifle Division suffered losses in killed, wounded and missing amounting to 90 per cent, the 7th East Siberian Division lost 66·1 per cent, the Fortress Artillery 53·7 per cent, the Field Artillery 23·7 per cent. The 5th East Siberian Rifle Regiment lost in killed 61·1 per cent of officers and 33 per cent of men, in wounded more than 100 per cent of its officers and 92·1 per cent of men. This regiment is shown separately as not included in either the 4th or 7th East Siberian Rifle Division. The total loss in men was 125·1 per cent, in officers considerably more. The explanation of a total loss being shown as over 100 per cent is of course due to wounding of particular individuals on more than one occasion. It may be noted that among Regiments included in the 4th and 7th East Siberian Rifle Divisions the 14th East Siberian Rifle Regiment lost 113·3 per cent.

The figures above given speak for themselves.

The health of Port Arthur garrison under the circumstances of the first months of the defence was considered quite satisfactory. In the second half of the siege epidemic disease (enteric fever, dysentery and scurvy) was rife, and the sick rate, which in the Russian month of May was 5·4 per cent was in the Russian month of November 23·2 per cent. Eighteen officers and 1,508 men died of disease.

It was not possible to make any effective resistance to the incidence of scurvy; the author gives many details regarding the food supply and rations of the garrison and the measures taken to deal with the disease, the outbreak of which was, under the circumstances, inevitable.

In June and July the first few cases of scurvy occurred, and as the fresh meat ration failed the incidence of scurvy increased until the great majority of the garrison was affected. This disease appears to have been the most important factor in the weakening of the garrison by disease. Otherwise when all circumstances are taken into consideration there seems little to cavil at regarding the fight against other diseases; there is indeed evidence that the legislative element (including the medical officials) and the executive element were each to be regarded as efficient in measures of hygienic policy and discipline.

But, be that as it may, the general ill-health of the garrison in the latter part of the siege was directly and indirectly a very important factor in determining the necessity for capitulation. The power of recovery from wounds was greatly lowered by previously existing illness, and so the proportion of wounded returned from the hospitals to the ranks became steadily lower. Before the end of the siege, even in the works most exposed to assault, the proportion of men partly incapacitated by scurvy

was over 40 per cent, whereas the other works were manned by cripples, some of whom could only get about by the aid of sticks. One man of the Siberian Rifles, blind in both eyes, was among the defenders of High Hill; he was led into the trenches and threw grenades under the direction of a comrade.

The main point inculcated in this valuable work is the necessity for consideration of the requirements of the human fighting machine if this is to be expected to work satisfactorily; incidentally, the necessity for affording facilities for repair. Much light is thrown on certain aspects, still perhaps not fully appreciated, of modern defensive warfare. It is not the fortune of every garrison, unsuccessful in the end, to sell its warlike effects at as dear a price as the Russian garrison of Port Arthur. Had the Japanese land forces paid less generously, it is doubtful whether they would have had to wait longer for success; indeed the question is whether (as in certain other sieges) shrinkage (due to the act of the enemy) in the ration list of the defenders did not contribute to the postponement of the date of capitulation. G. S. McL.

Reviews.

MEAT AND FOOD INSPECTORS' EXAMINATIONS. By G. T. Billing and A. H. Walker. London Sanitary Publishing Co., Ltd., 1911. Pp. x and 156. Price 3s. 6d. net.

As stated in the preface, this book is intended to cover the syllabus of the meat and food inspectors' examination of the Sanitary Institute, and for this purpose is arranged in a series of questions selected from former examinations, with very full model answers.

There is no doubt such an arrangement has much to commend it to candidates for examination, to refresh the memory and to accustom them to answer in the best manner, but it must never be relied upon alone in place of more extensive reading in all branches of the subject. The questions extends over a large field and includes such subjects as the signs of disease in animals, the diseases of animals, fowls and fish, the state of the organs and carcases in health and disease, parasites and parasitic disease, bacterial diseases, potatoes, limejuice, beer, cheese, coffee, flour and the preservation and storage of foods. The two last sections are devoted to a certain amount of law and a set of *viva voce* questions.

To the ordinary reader the first section will probably be unpleasant reading, as it certainly conveys an impression to the mind that there is still some unnecessary cruelty in our methods of slaughtering animals intended for food. The authors evidently had such a thought in their minds, as on one or two occasions they suggest in the answers given some more humane methods, and for this they are to be thanked. The section on bacterial diseases sets forth in a very clear manner the precautions to

be taken in outbreaks of anthrax and foot-and-mouth disease among others, and the chief provisions of the Anthrax Act of 1899 are also included.

The section on the preservation and storage of foods contains much valuable information, and we are glad to notice that, in examining a consignment of tinned supplies, the authors recommend that 10 per cent. of the cases should be opened, as this is the usual procedure in the service.

In the average composition of the various foods given, we should prefer to read salts or mineral matter in place of salt, which is rather apt to convey the idea that sodium chloride alone is meant. In answer to question 127 the authors leave rather too much to the imagination when they state that the surest test to detect adulterants in coffee "is to put some grains under the microscope, coffee grains having a distinct appearance from ground chicory, and starch grains from cereals." Simply to mention microscopical examination would have served the purpose equally well where detail is not required. Taking the book as a whole, it is surprising what a vast amount of information can be obtained on all subjects connected with the inspection of food, and the clear manner in which the questions are answered renders them most interesting reading.

The authors have evidently introduced a great deal from personal experience, and we can confidently recommend their work as useful, not only to those preparing for the meat and food inspectors' examination, but also to all officers of the medical and supply branches of the Army.

W. W. O. B.

A Study of Melting-point Determinations, with special reference to the Melting-point Requirements of the U.S. Pharmacopœia. (*Hygienic Laboratory, Bulletin* No. 70, October, 1910.) By George A. Menge.

The title of this Bulletin explains the necessity for its production. It is obviously desirable that there should be some conformity in the methods of determining the melting-points of official standards in the various pharmacopœias, and as the author points out, though theoretical accuracy in melting-point determinations is highly desirable, it is not so vitally important for the purpose of standardisation of pharmacopœial products as uniformity of practice. Methods should be, therefore, compatible with accuracy, as simple as possible and some form of the capillary-tube variety serves the purpose best.

The method recommended for incorporation in the official melting-point requirements of the United States Pharmacopœia is to be commended in this respect, as being simple, reliable and efficient, besides giving evidence of very careful and accurate work in obtaining the result.

A very clear summary of the causes of divergence in melting-point values is given as follows:—

(1) Varying definition of melting-point.

(2) The common practice of co-ordinating melting-point and decomposition point.

(3) The great variety of methods.

(4) Variable practice in use of thermometers.

(5) Varied individual manipulation.

(6) Variation in physical condition and in preliminary treatment of the compound.

These are discussed in such full detail that one wonders whether it were possible to add more to the subject. With regard to the use of thermometers, in this country at least, officially certified thermometers are invariably used for work of this nature.

A most interesting and very full description of all the methods for this determination follows, illustrated with remarkably clear diagrams, which serve at a glance to convey the meaning of the text.

The excellence of this Bulletin is somewhat marred by sentences such as occur on page 71: "The 'personal factor,' in so far as the phrase implies psychological variation inherent to different individuals, is doubtless a material and legitimate cause of divergence, to some slight and varying degree, in any equally conscientious comparative work."

The Bulletin should be carefully read by all interested in this subject; there is much that will prove useful, and its production will doubtlessly further the result so earnestly advocated. W. W. O. B.

THE TREATMENT OF SYPHILIS WITH SALVARSAN. By Sanitätsrat Dr. Wilhelm Wechselmann; with an Introduction by Professor Dr. Paul Ehrlich. Translated by Abr. L. Wolbarst, M.D. London: Rebman, Ltd. Price 21s. net.

This work is evidently designed to provide the most enquiring reader with all the information he is likely to seek concerning salvarsan. An introductory chapter devoted to the purely scientific side, with a very complete account of early experiments which led up to the discovery of salvarsan, is followed by Wechselmann's remarks on its effects in syphilis, based on 1,400 cases he had treated at the time of writing, its contra-indications, and the various methods of preparing it for injection which have been adopted by numerous workers. Forty-seven pages are devoted to a review of the literature, and this includes a table from which the reader can rapidly gather an idea of the experiences of the different authors mentioned. The book concludes with a summary in which the questions of arsenic-fast strains of spirochætes, enclosed foci of spirochætes, and formation of specific antibodies, with the effect of the mother's milk on the congenitally syphilitic infant, are discussed. The illustrations, which include sixteen large coloured plates, complete a work which we heartily recommend for its reliability and absorbing interest. L. W. H.

"606" IN THEORY AND PRACTICE. By Geheimrat Professor Dr. Paul Ehrlich and J. E. R. McDonagh, F.R.C.S. London: Henry Frowde and Hodder & Stoughton. Price 7s. 6d. net.

At a time when reports as unjustifiably pessimistic as the first ones were optimistic are being circulated regarding the effects of "606," a contribution from the pen of Professor Ehrlich, who is in a better position to judge the pro's and con's of his remedy than anyone, must be very welcome. In the first part of this book a short interesting account is given of the steps which led to the discovery of "606," while the second contains a complete answer to those critics who have asserted that the remedy has an injurious effect on the optic and auditory nerves in certain cases. Thus Professor Ehrlich made special enquiries from the numerous practitioners to whom he distributed many thousands of doses before he would allow the preparation to be placed on the market, regarding its

effect on these nerves, and up to September last had not received a single report of optic atrophy following its use in 8,000 cases; auditory nerve trouble had followed the administration at some time or other in nine out of 7,000 cases, but it was clearly proved that the nerve affection was a manifestation of syphilis and not of any organotropic action of the remedy. In the second and third parts of this chapter the discussion on fatal cases due to "606," as well as that on its contra-indications, is specially valuable. The remainder of the book is devoted to methods of administration, a general account of the effects of the remedy, and a more particular one, illustrated by many cases, of its effects on the various manifestations of syphilis and parasyphilis. Naturally the authors can say little at this time regarding the permanence of the results, but the records of cases where a fresh infection has occurred months after an injection of "606" are very suggestive.

The first part of the chapter on methods of administration would have been easier to follow if it had been arranged in a more orderly manner; following a description of two methods of making up the preparation for intramuscular injection comes a paragraph on results of intramuscular injection, then two other methods of preparing the remedy, and, lastly, a description of the clinical course after an intramuscular injection, which is very largely a repetition of that under "Results" of intramuscular injection. Unnecessary repetition is to be avoided in a short work on a large subject, and still more so unnecessary matter, so that we find it a little difficult to understand why the author should direct us to dissolve the powder in ethyl alcohol in seven lines occupying the middle of a paragraph, and inform us in two lines at the end of the same paragraph that alcohol is not necessary. In the section which deals with intravenous injection the author concerned advances reasons for preferring the syringe to the transfusion method which betray very little practical acquaintance with the latter. Our experience with both the syringe and the transfusion apparatus would have led us to claim such advantages as "The needle is not so easily dislodged," "The operator has more control," and "There is no danger of air gaining access to the vein" for the transfusion method rather than the syringe. We think few will agree with Mr. McDonagh in his preference (expressed on p. 64) for the indian-ink to the darkground illumination method of demonstrating the *Treponema pallidum*.

L. W. H.

AIDS TO PATHOLOGY. By Harry Campbell, M.D., B.S.Lond., F.R.C.P. Second Edition. London: Baillière, Tindall & Cox, 1911. Pp. viii. and 228. Price 3s. 6d. net.

This little book will be useful to many students for examination purposes, but cannot be recommended for more leisurely reading. The author attempts to cover the whole ground of Pathology, general and special, in a book of 228 small pages, and although the subject does not lend itself readily to condensed description, he has performed a difficult task probably as well as it could be done.

The article on immunity is up to date, and the subject is as fully treated as could be expected; but there is a curious mis-statement about agglutinins. The principle of the Wassermann reaction is well explained with the aid of diagrams. More space might, with advantage, have been

given to protozoan diseases—sleeping-sickness and kala-azar are dismissed in a few sentences of doubtful value; and in the description of the sexual cycle of malarial parasites the gametes of the malignant tertian parasite only are mentioned.

J. C.

ENLARGEMENT OF THE PROSTATE: ITS TREATMENT AND RADICAL CURE. By C. Mansell Moullin, M.D. F.R.C.S. London: Baillière, Tindall and Cox, 1911. Pp. viii. and 240. Price 3s. 6d. net.

We are glad to notice that this little book of 200 pages has reached a fourth edition. The name of the author is enough to establish its popularity, and his treatment of the subject is as clear and exhaustive as his knowledge of the disease is extensive.

The first chapter is devoted to a description of the normal structure and function of the prostate. The third and fourth chapters deal with the causes and effects of prostatic enlargement, while the symptoms and methods of examining the diseased gland are detailed in sequence.

The treatment of this condition is next discussed, both palliative and operative. The two routes for removing the enlarged prostate are fully described, though no indication is given as to preference of either method. It appears as if the work of Freyer in developing the supra-pubic route has scarcely met with the recognition to which it is entitled.

Palliative measures such as Bottini's operation are rightly depreciated and have seldom commended themselves to English surgeons.

The question of orchidectomy is well discussed and the cases suitable for this line of treatment are clearly defined.

The book presents a masterly survey of this disease and should prove of much value to those treating cases of this disability.

J. W. H. H.

Current Literature.

The Estimation of Physical Condition and Military Efficiency by Pignet's Method.—By Regimentsarzt Dr. Gustav Pollak (*Militärarzt*, December 9th, 1910, p. 273.) This paper gives an account of the application of Pignet's formula to an examination of certain men of the 2nd Corps. In this formula the chest measurement (in forced expiration), in centimetres, is added to the weight in kilogrammes, and the sum of these subtracted from the height in centimetres, *i.e.*, $H - (W + C)$. The figure thus arrived at is used as an index of physical efficiency; the lower the figure the more satisfactory the condition. It is understood, of course, that the weight is due to healthy tissue, not to extreme obesity.

Pignet fixed the following scale, viz: 10 and under, very strong; 11 to 15, strong; 16 to 20, good; 21 to 25, medium; 26 to 30, weak; 31 to 35, very weak; above 35, useless.

Sistini, an Italian naval medical officer, varied the scale and substituted the following series. Under zero extremely robust; 0·5 to 10,

robust; 10·5 to 25, good; 25·5 to 30, medium; 30·5 to 35, weak; above 35, very weak.

Dr. Pollak took measurements of detachments of men, 200 to 350 strong, from 25 units of the 2nd Army Corps; one-year volunteers and long service men being excluded. The scale he adopted ran as follows, in 12 classes. Under — 15; —15 to — 10·1; — 10 to — 5·1; — 5 to zero; 0·1 to 5; 5·1 to 10; 10·1 to 15; 15·1 to 20; 20·1 to 25; 25·1 to 30; 30·1 to 35; 35·1 to 40.

Taking the entire number of men measured (6,285) he found that 28·5 per cent of these came between 10 and 15, and 24·6 per cent between 15 and 20, or rather more than half the total—accurately 53·1 per cent—between 10 and 20. On Pignet's scale these would be classed as "strong" to "good," and on Sistini's as "good." The scale fell steadily on either side of the maximum, but the larger number of men were in the better classes. Thus 28·24 per cent were ranged below 10, and only 18·66 per cent above 20. The highest index given was 39, the lowest — 23. Eight units showed no index higher than 30, and 18 none above 35, whilst more than half (28 out of 54) men in the class 30·1 to 35 came from three units, one of which furnished as many as 16 men. The author concludes that if certain units are excluded, the weaker classes are hardly represented in the ranks, or only in scanty numbers. Taking the average of all measurements, the index was 14·1, a distinctly good figure. The best regimental average was 11·2, and the worst 20·1. In the weakest unit the largest number, 49·1 per cent, of men fell between 15·1 and 25, whilst in the strongest they were grouped between 5·1 and 15 (56·8 per cent). The distribution was, apart from this, very uniform in units, there being, even in the two just named, no striking preponderance of men at either end of the scale.

The average index of all men examined was 14·1, the best in any one unit being 11·2 and the worst 20·1. The result is the same whether the average of all the indices be taken, or an average index be calculated from the aggregate of the different measurements.

Taking different arms of the Service, the Cavalry seem to be the most level, 79 per cent of the total falling in the three classes between 5 and 20. This is partly due to the fact that recruits for the Cavalry are only accepted between certain measurements. Thus men over 172 cm. (5 ft. 8 in.) are not taken, and excessive weight is also a reason for rejection. The average weight and height of men of this arm is less than the general average; as regards weight, 10 st. 2¾ lbs., as against 10 st. 7¾ lbs., and as regards height, 5 ft. 4¾ in., as against 5 ft. 7 in.

Dr. Pollak gives a table showing the indices for different years of service. As might be expected, the men enlisted in 1906 and 1907 show a slight improvement over those enlisted in 1908. The difference is not, however, great. As regards the general average of the 1906 men, 71·3 per cent of the total number examined fall between 5 and 20, of the 1907 men 71·4 per cent, and of the 1908 men 70·1 per cent. The difference is more marked in the case of the classes on either side of the medium. Thus of the 1906 men 12·6 per cent have indices below 5, of the 1907 men 11·6, and of 1908 men 8·6 per cent. Amongst the classes possessing high indices the reverse naturally occurs. Whether this is to be attributed to an eradication of the weaker men or an improvement in the general physique is not certain. The measurements were taken in

February, by which time it is probable that most of the "weeds" of the last year's contingent had been thinned out.

Discussing the influence of the different factors which go to make up the index, Dr. Pollak points out that the chest measurement is the most important. Each index group has in the majority of cases a definite chest measurement. Thus no man with a chest measurement of less than 75 cm. (30 in.) has an index lower than 20; no man with a chest measurement over 95 cm. (38 in.) an index higher than 10. On the other hand, the distribution of indices amongst men below 5 ft. 4 in. is not markedly different from that amongst men above 6 ft. 2 in. Weight appears to occupy an intermediate position in this respect. The great value of chest measurement as a test of a man's fitness for military service is thus confirmed. Comparing his figures on the basis of Broca's law of weight (weight in kilos. = height in cm. — 100) the author shows that men with indices lower than 15 usually show an excess of weight, whilst above that figure there is a deficiency of weight. Similarly the taller a man is the more likely he is to be under weight.

Dr. Pollak's paper is extremely interesting and instructive as an anthropometrical study. Used with care, and applied only to men of approximately the same age, breed, and upbringing, Pignet's formula undoubtedly is useful as giving a general idea of the class of man under consideration. It balances the various factors more satisfactorily than Broca's formula given above, giving to each of them a more reasonable amount of recognition. It does not appear that it can be of much use to an officer with any practical experience of recruiting, since in the case of any individual recruit his own judgment will be far more reliable than any hard-and-fast rule of a mathematical nature. It should, however, possess a distinct value in the event of its being desired to ascertain the effect, on a batch of recruits, of the system of military training they have undergone. Even here, however, the formula can only be applied to large bodies of men. In the case of individual soldiers, as in that of recruits, the experienced medical officer should need no such mathematical crutch to enable him to come to a satisfactory conclusion as to the effect of training. An excellent account of work done on similar lines by various observers is given in the *Militärarzt* for August 21st, 1908, September 4th, 1908, and September 18th, 1908, by Dr. Erhard Glaser. C. H. M.

On the Use of Aluminium for Splints in the Field.—Stabsarzt Filbry (D.M.Z. November 20th, 1910) points out that for field surgery, plaster of Paris bandages make the best splints, but that, owing to the quantity of plaster and bandages required, the supply is likely to run short after a battle. He suggests that perforated sheets of aluminium should be carried by the field medical units. These can be cut by any kind of scissors and moulded on to the limb over a stocking or other protective material; the aluminium sheet is then fixed by means of a plaster of Paris bandage, the plaster in which penetrates into the holes in the aluminium and forms a very strong splint.

By using this form of splint the amount of plaster and the number of bandages necessary are reduced to one-half, as is also the weight of the splint.

This kind of sheet aluminium is used by builders for reinforcing

partition walls, &c. A sheet forty inches square costs 9s. and should be sufficient for ten splints.

C. E. P.

Death due to Absorption of Iodine used for Sterilization of the Skin.—Médecin-Major P. de Broe (*Archives Médecine et Pharmacie Militaires*, February, 1911). The patient was a soldier, admitted to the hospital at Amiens, in order to have a very large congenital inguinal hernia on the left side operated on. He was kept under observation for some days; all the internal organs appeared to be quite healthy. On the evening before the operation he took a plain hot bath and thoroughly washed his whole body with soap. Next morning, just before the operation, the skin was painted with tincture of iodine (1 in 10 P.F.); the area treated extended from the commencement of the buttocks up to just below the navel, and from the left iliac spine to near the right iliac spine. Local anæsthesia (cocaine) was employed. The operation, which proved somewhat troublesome, was successfully completed.

During the night the patient had a slight cough; auscultation failed to reveal any signs of disease beyond a few râles in the trachea. The front of the chest from the root of the neck as far as the nipples was painted with the same tincture as was used to sterilize the skin. Everything appeared to be progressing satisfactorily till the middle of the following night, when the patient suddenly began to suffer from intense itching over the skin of the chest and upper abdomen.

When seen next morning both areas which had been painted with the tincture of iodine showed an intense erythema multiforme which extended beyond the areas actually painted. There was also double conjunctivitis and his temperature was 103·4, pulse 96. The patient only complained of the itching and of feeling feverish. The abdomen and thorax seemed to be normal, the only sign of disease being the dermatitis. The inflamed area was bathed with boric lotion, and then with a 10 per cent. solution of hyposulphite of soda, to neutralize the remaining iodine. During the day there was practically no change; the itching became less intense, but the dermatitis spread over a larger area. Urine was passed normally, but the bowels had not acted since the operation. By evening the temperature had risen to 104·5, the pulse to 110, and the conjunctivitis and lachrymation had become more marked; slight coryza was also present.

During the following night his condition became much worse, the principal symptom being involuntary movements amounting at times to convulsions, and necessitating forcible restraint in bed. He passed three diarrhœic motions involuntarily. A little later marked divergent strabismus was noted. The following morning a condition of collapse set in which failed to respond to any stimulation. Stertorous breathing followed by dyspnœa and cyanosis ushered in the fatal termination.

Autopsy.—The wound was healthy and apparently healing by first intention. The peritoneum was normal. The lungs were extremely congested. The pericardium contained about ⅔ ounce of serous fluid. The liver weighed 98 ounces, but its structure appeared to be normal. The spleen weighed 14 ounces and was more friable than usual. The kidneys weighed 7 ounces and 8 ounces respectively and appeared to be œdematous. Specimens of blood and bile were examined chemically, but no iodine

was detected. Two similar fatal cases were reported at the last German congress on surgery. C. E. P.

Salvarsan in Chorea.—Bokay (*Deutsch. med. Woch.*, January 19th, 1911). This writer reports a case of chorea in a girl aged 8. The disease had appeared a year previously, and had apparently been cured by liq. arsenicalis. It, however, reappeared in a severe form, necessitating her admission to hospital. An injection of 0·2 gramme of salvarsan was made into the glutei on November 11th. By the 30th November practically all signs of the disease had disappeared. A course of arsenic by the mouth was begun in the middle of December to obviate any tendency to a relapse. C. E. P.

The Fate of Salvarsan after Injection.—Bornstein (*Deutsch. med. Woch.*, January 19th, 1911). In order to determine what happens to salvarsan after being injected, Bornstein made a series of experiments on rabbits. In one series the injection was made into a vein and in the other into the subcutaneous tissues; the animals were killed at certain periods after receiving the injection, and their tissues were analysed for arsenic. In each case 0·025 gramme of salvarsan was injected. The results in terms of As_2O_3 are shown in this table.

I.—Intravenous Injection.

	In urine and fæces	In the blood (approximate)	Liver	Kidneys and spleen	Heart, lungs and brain	Muscles	Bones
(1) Killed 1½ hours after the injection	0·2 mgm.	1·1 mgm.	—	—	—	—	—
(2) Killed 40 hours after the injection	1·2 ,,	0·8 ,,	5·2 mgm.		0·4 mgm.	1·0 mgm.	0·4 mgm.
(3) Killed 3 days after the injection	1·2 ,,	—	2·4	2·6	—	—	—
(4) Killed 8 days after the injection	1·5 ,,	0·5	2·0	2·2	—	—	—
II.—Subcutaneous Injection.							
(5) 40 hours after the injection	0·4 ,,	0·6	1·9	—	—	0·7	0·3

Remaining at the site of injection 4·8 mgm.

Bornstein also had the opportunity of examining the organs of a man who died of an intercurrent affection fourteen days after an intravenous injection of salvarsan. In this case the liver contained 6·5 milligramme, the kidneys 3·1 milligramme, and the spleen 1·8 milligramme of As_2O_3.

As a result of his researches Bornstein says, that after subcutaneous or intramuscular injection of salvarsan, arsenic can be found in the urine for some three weeks, but in the internal organs for several months. After an intravenous injection the bulk of the drug is stored in the liver, kidneys and spleen. In no case does it circulate in any quantity in the blood. C. E. P.

Salvarsan in Malaria.—Iversen and Tuschinski (*Deutsch. med. Woch.*, January 19th, 1911). In order to test the value of salvarsan in malaria the writers went to the Caucasus and treated altogether sixty-one cases of malaria; these included benign and malignant tertian as well as the quartan forms. Their conclusions are :—

(1) An intravenous injection of 0·5 gramme of salvarsan exerts a specific effect on all forms of malaria.

(2) In tertian cases the parasites usually disappear from the circulation within forty-eight hours, but the writers cannot say definitely that a recurrence will not take place.

(3) In quartan forms salvarsan has only a slight and temporary effect.

(4) In malignant tertian forms, even when doses up to 0·8 gramme are used, salvarsan only causes a temporary disappearance of the ring parasites from the circulation. The crescents are not affected.

(5) In some cases of malignant tertian malaria salvarsan produces a temporary improvement followed by an aggravation of all the symptoms, with a considerable increase in the number of parasites present.

C. E. P.

Jaundice after an Injection of Salvarsan.—Klausner (*Münch. med. Woch.*, March 14th, 1911) discusses the effect of salvarsan on the blood. Several observers have noted great variations in the number of red blood corpuscles within a few hours or days of an injection of salvarsan. At the same time there is marked urobilinuria. These phenomena are explained by presuming that salvarsan destroys a large number of red blood corpuscles, and at the same time stimulates the production of new ones.

Klausner reports four cases in which an injection of salvarsan was followed by a marked jaundiced condition of the skin. In three cases the staining appeared on the second day, but in the fourth case not until the fourteenth day after the injection. In three of the cases the injection was followed by a severe general reaction. In all cases the urine contained quantities of urobilin. There was no disturbance of the digestive functions and the jaundice cleared up in a few days. Michelli and Quarelli who have investigated similar cases, suggest that the jaundice is due to the action of arsenic on the cells of the liver. C. E. P.

The Effect of an Injection of Salvarsan on the Blood Pressure.—Sieskind (*Munch. med. Woch.*, March 14th, 1911) has investigated this subject with special reference to intravenous injections of salvarsan. He shows that salvarsan in ordinary doses, whether injected subcutaneously or intravenously, produces a fall in blood pressure in most cases equal to roughly 30-40 cm. of water, and which lasts from about three to ten days. Very small doses may not affect the blood pressure. This fall in pressure is not sufficient to constitute a danger to the patient. Salvarsan should be used with great caution for patients in whom the blood pressure is normally low. C. E. P.

The Therapeutic Value of Salvarsan ("**606**").—By Professor Ehrlich (*Münch. med. Woch.*, No. 1 of 1911). In a lengthy lecture to a post-graduate class in Frankfurt Professor Ehrlich reviewed the results

obtained up to the present in the treatment of syphilis by salvarsan. (This is the name which he has now bestowed on the preparation recently known as Ehrlich-Hata "606.")

After dealing fully with the unfavourable criticisms emanating mainly from French sources, he proceeded to discuss in detail the complications which have been reported as occurring after the use of salvarsan. The first group embraces affections of the auditory and optic nerves. These nerves were undoubtedly attacked by the earlier arsenical preparations, atoxyl and arsacetin, consequently salvarsan was received with some suspicion. Up to the present some 25,000 injections of salvarsan have been given, and only one case of atrophy of the retina has been reported. This patient had, however, received thirty injections of arsacetin and four courses of enesol (an arsenical preparation) injections during the preceding twelve months, so that it hardly seems justifiable to attribute the retinal atrophy to the single injection of salvarsan.

An inquiry made by Ehrlich revealed only nine cases in which the auditory nerve was affected among 7,000 patients who had been treated by injections of salvarsan. In all these cases the disease was in the earlier stages, from two to eight months standing; the patients had only received a single injection each, and in most of the cases the drug had been injected subcutaneously in the form of an emulsion. Ehrlich points out that deafness not uncommonly occurs in the early stages of syphilis, quite apart from the treatment employed. No cases of deafness were reported among the different series of patients in which the maximum dose of salvarsan was employed, and in some instances deafness, which had appeared while under other treatment, was cured by an injection of salvarsan. It is therefore by no means clear that salvarsan was responsible for the auditory affection in these nine patients.

Ehrlich then discussed the general toxicity of salvarsan, and pointed out that in comparison to chloroform it is extremely low, provided that the drug is not administered to patients suffering from marked degeneration of the central nervous system, or of the heart and large vessels, advanced nephritis, diabetes or malignant growths of the stomach. To illustrate how easily a new preparation may incur undeserved blame, he states that he has been informed of five different cases in which it had been determined to inject salvarsan. For some reason the injection was postponed, and all five of them died before it could be carried out. Had the injection been given, salvarsan would naturally have been credited with the fatal results.

As regards the possibility of curing syphilis by a single injection of salvarsan, Ehrlich speaks most hopefully. He again laid emphasis on the necessity of giving a large dose, if this result which he calls "Therapia sterilisans magna" is to be obtained. It may be found advisable to repeat the injection on several occasions and so obtain a cure on the principle of "Sterilisatio fractionata"; in other cases it may be necessary to employ mercury as well as salvarsan, a course to which Ehrlich is favourably inclined.

In regard to relapses after a single injection of salvarsan, Ehrlich quotes the following figures from published reports:—

Geronne treated 154 patients; of these in 57 cases the Wassermann reaction became negative, but in 67 it remained positive; 32 of the latter received a second injection, and in 25 of these cases the reaction subse-

quently became negative. Thus in 90 per cent. of the patients, one or more injections sufficed to induce a negative reaction.

Other workers have published the following results:—

	Number of patients treated	Number in which serum reaction failed to become negative
Gennerich	81	.. 3
Dubot	485	.. 3
Doerr	200	.. 7
Fabry	385	.. 6
Schreiber	800	.. 4

The results obtained by intravenous injection were superior to those of the subcutaneous methods. C. E. P.

Mental Disease due to Alcohol, in the Russian Army in Manchuria (*Le Caducée*, November 19, 1910).—Article by Ermakow, of Moscow, on his experience in treating mental cases during the Russo-Japanese war. Of 257 cases under his care 113, = 45 per cent., owned to excessive indulgence in alcohol. Another 7 per cent. were strongly suspected of having similarly indulged. In ninety-one cases there was a history of alcoholism in the parents. In three-quarters of the cases the abuse of alcohol had existed for many years. He also gives notes of the effect of native Chinese spirit; this produces a rapid and severe form of intoxication, with great depression of all mental and nervous functions, lasting for three or four days. C. E. P.

Trypanosomiasis, Cured by Injections of Tartar Emetic.—Med. Major Kerandel (*Le Caducée*, January 21st, 1911). This officer became infected with trypanosomiasis while doing duty in the French Congo in August, 1909. The following notes have been extracted from a paper which he read at the Société de Pathologie Exotique, and in which he gave a full description of his symptoms and progress.

The commencement of the disease was marked by a small boil-like swelling on the neck. At the same time he suffered from continued pyrexia and nervous irritability for a week. During the following month he had several attacks of fever lasting three to four days each. A period of quiescence next ensued and lasted about two months, when the characteristic symptoms of the disease began to appear. These are lassitude, palpitation, irregular pulse, general adenitis, localised œdema, erythema, formication and hyperæsthesia. Trypanosomes were found in his blood in November 1907 and treatment by atoxyl was begun, one gramme being injected every ten days. For a short time the trypanosomes disappeared from the circulation and his general condition improved. About ten days after the third injection there was a relapse and he was then sent to France. Here the atoxyl was given in smaller doses and more frequently, which again produced a temporary improvement. As the symptoms, however, became more alarming it was decided to try intravenous injections of tartar emetic. These were begun on September 14th, 1908, since which date, in spite of painstaking research, no further sign of the disease has been detected, and the officer has been able to perform all his duty. (The dose and technique employed are not stated.) C. E. P.

Rapid Staining with Azur-eosin.—(Giemsa, *Münch. med. Woch.* No. 47 of 1910). Giemsa begins with a short review of the various

modifications of Romanowsky's stain, and states that all of these have failed to give satisfactory results, especially in the out-patient department when time has to be considered. By using a modification of Leishman's method Giemsa thinks that he has found a satisfactory procedure for rapidly staining even such highly resistant organisms as the *Spirochæte pallida*. He mixes the solution published in the *Zentralblatt für Bakt.*, i., 1904, p. 398, with an equal volume of pure methyl alcohol in a drop bottle. This dilution serves to reduce the excessive proportion of glycerine (25 per cent.) which, although it preserves the solution, interferes with the fixation of the film, but when diluted with alcohol it helps both the fixing and staining of the specimen and tends to prevent deposits.

The actual procedure is as follows :—The smear is dried in the air and laid face upwards in a Petri dish ; sufficient stain is dropped on to entirely cover the preparation and allowed to act for thirty seconds ; ten to 15 cc of distilled water, or 10 cc of distilled water containing about two drops of a $\frac{1}{1000}$ carbonate of potassium solution, is then added so as to cover the slide and by shaking is thoroughly mixed with the stain. The mixture is allowed to act for three minutes, or in the case of spirochætes for five minutes. The slide is then washed in running water and dried, when it is ready for examination. Giemsa claims that his stain being more stable than Leishman's gives better results. C. E. P.

The Use of Collargol and Elektrargol in Sequelæ of Gonorrhœa.—Gennerich (*Berlin klin. Woch.* March 13th, 1911). These drugs are preparations of silver in a colloid form, obtained by the action of electricity. Collargol can be made up into an ointment (ung. Credé) and used in the form of an inunction, from 45 to 75 grains being rubbed into the skin, in the same way as mercurial ointment is used in the treatment of syphilis. Used in this way its effect is gradually developed. It can also be used as an intravenous injection, but produces an intense general reaction followed by severe prostration.

Elektrargol is superior to collargol, as it can be injected subcutaneously, in doses of 29 to 30 cc daily for long periods. It produces only a mild reaction and no local infiltration. Gennerich now treats every sequela of gonorrhœa, in which there is any pyrexia, by injections of 10 cc of elektrargol.

The yearly average number of patients treated is 600 ; during the last three years the percentage of cases in which the following complications have occurred is as follows : Epididymitis, 12 to 15 per cent ; ascending inflammation of the urinary tract (including pyelitis), 2 to 5 per cent ; prostatitis 5 to 10 per cent ; arthritis, 2 to 5 per cent ; endocarditis and myocarditis together 0·5 per cent.

Subcutaneous injection of elektrargol speedily reduces the pyrexia, especially in cases of arthritis. Local treatment should be continued along with the injections.

In cases of chronic arthritis, the joint is punctured and irrigated with $\frac{1}{2}$ to 1 per cent solution of collargol, after which it is kept at rest again. This produces rapid improvement.

C.E.P.

An Improved Method of Treating Gonorrhœa.—Siegfried Frankl (*Berlin klin. Woch.* March 27th, 1911). Frankl discusses the treatment of gonorrhœa and points out several unsatisfactory features in the present

methods. He specially recommends a method of treatment introduced by Dr. Karo. In this the medicament is suspended in mucilage, and placed in a collapsible tube with a cone-shaped nozzle (made by Dr. Melzer of Meiningen). Any desired drug can be put up in any required strength. The patient first passes water, and cleanses the prepuce and meatus; he then opens the tube, inserts the nozzle into the meatus, and presses this firmly on to the tube with his forefinger and thumb; by compressing the tube he forces some of its contents into the urethra. The tube is then withdrawn, the meatus closed, and the urethra gently massaged, in order to distribute the mucilage along the canal. A plug of absorbent cotton wool is worn over the end of the penis to prevent the linen from being stained.

The great advantage of this plan of treatment is that the medicament remains in the urethra for a long time, so that the gonococci escaping from the interior of follicles and ducts are killed and cannot reinfect the urethra.

Frankl also speaks very highly of "Buccosperm" capsules. These contain the active principles of copaiba and buchu, together with small quantities of urotropin and salicylic acid. The capsule does not dissolve until the small intestine is reached. C. E. P.

A Case of Simulated Mumps. Méd. Aide-major Bertaux (*Archiv. Méd. Pharm. militaires*, December, 1910.) A soldier who had had mumps in August, 1909, was re-admitted for the same disease in January, 1910. In February, 1910, he presented himself again, apparently suffering from mumps.

The glands of *both* sides were very extensively swollen; he stated that the swellings had appeared suddenly and that he had not been in contact with anyone suffering from mumps. The tumours persisted for three weeks without any diminution in size and were emphysematous.

Under threats of severe punishment he disclosed the method by which he produced the swellings. One day when amusing himself by blowing into a trumpet he found that his parotid glands became swollen and remained so for some time. He knew that a swelling of the parotid glands is one of the main symptoms of mumps, and that patients suffering from this disease are isolated for three weeks. It therefore occurred to him that he might by forcibly inflating the glands procure a rest in hospital at any time. He found it easy to produce the swelling by simply filling his mouth with air, placing his hands on his lips and making a prolonged expiratory effort. C. E. P.

Treatment of Ringworm. Dr. Racbiger (*Archiv. für Schiffs u. Tropen Hygiene*, Bd. xiv., Heft. 20) reports very satisfactory results from the use of "Nikotian" soap in the treatment of ringworm in German East Africa. The soap is prepared by C. Mentzel, Bremen, and is made by mixing tobacco extract with precipitated sulphur and superfatted soap; the makers state that it contains 0·35 per cent. of nicotin. The soap is rubbed into the affected parts morning and evening till a lather is formed, which is then allowed to dry on the skin. Before each fresh application the skin is well washed. In some cases a certain amount of irritation is produced; in these cases the soap is washed off at the end of two or three hours. The patients were cured in from four to eight days. The soap

may also be used to relieve the itching which may occur in other skin diseases, *e.g.* scabies, pruritus, etc. C. E. P.

Incontinence of Urine. Delamare (*Archiv. Méd. Pharm. Mil.*, January 1911).—The writer records nine cases of nocturnal enuresis cured by injection of normal serum. The technique is as follows:—With tincture of iodine mark two spots on the perineum 1 to 2 centimetres on either side of the bulbar prominence and midway between the anus and commencement of the scrotum; at each point inject 80 grammes of normal serum into the subcutaneous tissues. The injection should be made rapidly, in order to prevent the fluid from diffusing into the cellular tissues. Some headache and pyrexia are noticed after the injection, but these pass off within twenty-four hours.

Four cases were cured after a single injection each, two others required two injections, and three were only cured after repeated injections.

C. E. P.

Strength of the Salt Solution used for Intravenous Injection of Salvarsan.—(*Deutsch. med. Woch.*, March 23rd, 1911) Marschalko came to the conclusion that when salvarsan is dissolved in normal salt solution and the solution of caustic soda is subsequently added, the result is to form a strongly hypertonic solution, and that the unpleasant sequelae, which not infrequently follow an intravenous injection of salvarsan are in reality due to the hypertonic solution. To test the correctness of his views he tried dissolving the salvarsan in a solution containing only 0·6 to 0·4 per cent. of sodium chloride, instead of the customary 0·9 per cent. In forty cases in which this solution was employed, the results were most satisfactory. C. E. P.

Correspondence.

ETHER IN THE TROPICS.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—May I add my testimony to the possibility of using ether satisfactorily in the tropics by means of Clover's inhaler?

During my tour at Sierra Leone a considerable number of operations were done, and the anæsthetic almost invariably used was ether.

It was noticed that the patients went under more rapidly than at home.

As regards the apparatus, I have found that many young officers do not understand its workings, and from this cause they prefer to give chloroform.

After they have successfully given ether two or three times, they very seldom elect to go back to chloroform. Unless gas is available, I always start with chloroform.

Bags are now supplied made of a substance called Pegamoid and are

practically everlasting. (I have seen a pig's bladder made use of for over twelve months, instead of the rubber one, and it acts quite satisfactorily).

The rubber cushions of the face-piece are made of stronger material and do not give much trouble as a rule.

I am, &c.,

F. J. W. PORTER,
Major, R.A.M.C.

The Alexandra Hospital,
Cosham, Hants.
April 12th, 1911.

RESISTANT FORMS OF *TREPONEMA PALLIDUM*—A SUGGESTION.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

DEAR SIR,—I have read with profit the paper on the use of salvarsan in syphilis, contributed to the April number of your Journal, by Major Gibbard, Captain Harrison and Lieutenant Cane.

Amongst the reasons they give as possible explanations of relapse cases after intravenous injection, there is one which specially excites my interest at present, namely (*b*) "a developmental stage exists in which the parasites are always resistant (analogous to spore formation in some bacteria)." This suggestion, I venture to think, is probably the correct one, in view of what I have recently discovered[1] as regards granule-shedding in the case of our spirochæte of Sudanese fowls. I believe most, if not all, the pathogenic spirochætes will be found to present this phenomenon, both naturally at the crisis (in spirochætal diseases which present a crisis), and when subjected to the action of such a drug as salvarsan. I have already found the granules of *Sp. granulosa penetrans* to be resistant, and the fact that their staining affinities are peculiar may perhaps be explained on the supposition that they are of a "spore" nature, and hence require special staining methods. In this connection, reference may be made to a paper by Bosanquet[2] on *Sp. anodontæ* and a most suggestive article on spirochæte morphology and classification by Dobell.[3] I think if the authors of the paper on salvarsan in syphilis were to employ the dark-field method of examination, they might obtain light

[1] A. Balfour (April 1st, 1911), "The Infective Granule in certain Protozoal Infections, as Illustrated by the Spirochætosis of Sudanese Fowls." *British Medical Journal.*

[2] W. C. Bosanquet (February 1911), "Brief notes on the Structure and Development of Spirochæta anodontæ Keysselitz." *Quarterly Journal Microscopical Science.*

[3] C. C. Dobell (April 1911), "On Christispira Veneris, nov. spec.; and the Affinities and Classification of Spirochætes." *Quarterly Journal Microscopical Science.*

on the problem with which they deal. I am at present trying to obtain a suitable case of syphilis, in order to see if the *Treponema pallidum* is or is not a granule-shedder.

I am, &c.,

Wellcome Research Laboratories, ANDREW BALFOUR, M.D.
Gordon College, Khartoum. *Director.*
April 23rd, 1911.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

DEAR SIR.—With reference to the short note on granule-shedding in spirochætes which I sent you from Khartoum, on April 23rd, I have now, thanks to the courtesy of Major F. F. Carroll and Captain McK. Saunders of the Egyptian Medical Service, had an opportunity of examining by the dark-field method a preparation put up by Captain R. G. Archibald from a case of syphilis. It consisted of serous fluid obtained by scraping the surface of a buccal mucous tubercle which had previously shown the presence of *T. pallidum* in fair numbers. The hanging-drop was prepared without any addition of salt or citrate solution four hours after the patient had received a dose of 0·3 gramme of salvarsan subcutaneously.

On examination Captain Archibald and I found at first many motile, highly refractile granules recalling very strongly those found in fowl spirochætosis. There were also motionless and empty "periplasts" or cell membranes. After some search a *T. pallidum* was discovered actively engaged in granule-shedding, apparently in a manner identical with that displayed by *Sp. granulosa penetrans*. It would, therefore, seem that the hypothesis advanced in my former note is correct, that under the influence of a drug like "606" the spirochæte of syphilis sheds granules which are doubtless resistant forms and may be of a "spore" nature. The bearing of this observation on the treatment of syphilis is probably sufficiently obvious and, in any case, the phenomenon would seem to prove that the second suggestion advanced by Messrs. Gibbard, Harrison and Cane, as possibly explaining relapse after intravenous injection, is the correct one.

I am, &c.,

Wellcome Research Laboratories, ANDREW BALFOUR, M.D.
Gordon College, Khartoum. *Director.*
April 27th, 1911.

MILITARY WIDOWS' FUND—BRITISH SERVICE.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—I would like to bring the above Fund to the notice of any of the officers of the Corps who may not know of its existence. This Fund was established many years ago for the benefit of the widows and children of

deceased officers of the British Service in India. The subscriptions are small, varying from Rs. 2 to 4 a month, according to the subscriber's pay, there being no entry subscription for an officer who joins the Fund within six months of his arrival in India, or within six months of his marriage, if that takes place in India.

In the event of an officer's decease while on the Indian Establishment, the Fund pays to his widow a sum varying from Rs. 2,400 to Rs. 3,600, according to the subscription he was paying at the time of his death, and in addition, if the widow is in India, Rs. 1,500 for herself, Rs. 500 for each child over 12, and Rs. 300 for each child under 12, as passage money to England. These amounts are paid irrespective of the financial condition of the deceased officer's estate, or the amount for which his life may have been insured.

The present Honorary Secretary of the Fund is Major A. F. Cumberlege, R.E., and the offices are at Simla. Probably the majority of officers know of this Fund, but there may be some who do not, and so I venture to draw attention to it.

I am, &c.,

Fyzabad,
April 18th, 1911.

W. R. P. GOODWIN,
Captain, R.A.M.C.

THE ROYAL ARMY MEDICAL CORPS COMPASSIONATE FUND.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—Lieutenant-Colonel Wilson's letter in regard to the above Fund is sad reading.

Two things occur to my mind in reading it: (1) That the companies are not subscribing enough; (2) that many officers are not subscribing at all. If I may be permitted to make a suggestion, it would be that a special effort be made this (Coronation) year to put our Compassionate Fund on a more prosperous basis.

The suggestion is that each company be asked to give £5, and that each officer be asked to subscribe. The officer's donation should be in proportion to his rank, and retired officers at 10s. a head. If this were carried out, it would bring in a good sum, calculated as follows:—

37 Companies R.A.M.C.,	at £5	each	..	..	..	£185	0 0
12 Surgeons General	at £1	,,	..	..	..	12	0 0
30 Colonels	at 15s.	,,	..	..	..	22	10 0
160 Lieutenant-Colonels	at 10s.	,,	..	..	..	80	0 0
120 Majors	at 7s. 6d.	each		..	..	45	0 0
250 Captains	at 5s.	,,		..	..	62	10 0
208 Lieutenants ..	at 3s.	,,		..	..	31	4 0
50 Quartermasters ..	at 2s.	,,		..	..	5	0 0
500 Retired officers ..	at 10s.	,,		..	..	250	0 0
						£693	4 0

This sum would make a Coronation Fund of which we should all be proud, and would put Colonel Wilson's fund on a proper substantial basis, and would obviate the collapse which he fears may come about.

Cases always crop up requiring assistance. One has come to my notice during the last week, of a poor woman, the widow of a serjeant of the Corps, who for the last ten years has by hard work kept up a little home for herself and child, and has now been stricken down with neuritis, and is not likely to be able to work any more. Her child is a little girl about 13 years old.

I apologise for taking up your valuable space.

The Poplars,
Wellingborough,
Northamptonshire,
May 9th, 1911.

I am, &c.,
J. S. HARWOOD,
Colonel (*Retired Pay*).

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Distribution List of

SURGEON-GENERALS AND COLONELS

REMOVED FROM THE CORPS AND STILL ON THE ACTIVE LIST,

OFFICERS OF THE ROYAL ARMY MEDICAL CORPS,

RE-EMPLOYED RETIRED OFFICERS,

AND

MEDICAL OFFICERS OF THE HOUSEHOLD TROOPS.

1st MARCH, 1911.

[*This List is prepared according to the latest information contained in Official Returns. Officers are requested to register any Diplomas or special qualifications at Headquarters, War Office, in order that this list may be published as complete as possible.*]

ARMY MEDICAL SERVICE.

WAR OFFICE.

Rank.	Name.	Appointment.
Surgeon-General ..	Gubbins, W. L., C.B., M.V.O., M.B., K.H.S.	Director-General, Army Med. Service.
Colonel (temp. Surgeon-General)	Babtie, W., V.C., C.M.G., M.B.	Deputy Director-General, Army Medical Service.
Colonel	O'Keeffe, M. W., M.D.	Inspector of Medical Services.
Lieutenant-Colonel .	Burtchaell, C. H., M.B.	Assistant Director - General, Army Medical Service.
,, ,, ..	Eckersley, E., M.B.	Deputy Assistant Director-General, Army Medical Service.
Major	Birrell, E. T. F., M.B.	Deputy Assistant Director-General, Army Medical Service.
,, ...	Scott, B. H.	Deputy Assistant Director-General, Army Medical Service.
,, ...	Pollock, C. E.	Deputy Assistant Director-General, Army Medical Service (attached to the Department of the Director of Military Operations).

ARMY MEDICAL ADVISORY BOARD.

Rank.	Name.	Appointment.
Colonel	Bruce, Sir D., Knt., C.B., F.R.S., M.B.	Expert in Tropical Diseases.
Major	Horrocks, W. H., M.B.	Expert in Sanitation.

ROYAL ARMY MEDICAL COLLEGE.

Rank.	Name.	Appointment.
Lieutenant-Colonel	Risk, E. J. E.	Commandant and Director of Studies.
Major	Pilcher, E. M., D.S.O., M.B., F.R.C.S.	Professor of Military Surgery.
,, ...	Harrison, W. S., M.B.	,, Tropical Medicine.
Lieutenant-Colonel .	Melville, C. H., M.B.	,, Hygiene.
Major (Brevet-Lieutenant-Colonel)	Leishman, Sir W. B., Knt., F.R.S., M.B.	,, Pathology.
Major	Wanhill, C. F.	Assistant Professor of Hygiene.
Captain	Kennedy, J. C., M.D.	,, ,, Pathology.
Major	Gibbard, T. W., M.B.	Lecturer in Syphilology.

SURGEON-GENERALS.

Name.	Station.	Appointment.
Bourke, G. D., C.B., K.H.P.	Dublin	Principal Med. Officer, Irish Command.
Dorman, J. C., C.M.G., M.B., K.H.P.	London	,, ,, ,, Eastern Command.
Gallwey, Sir T. J., K.C.M.G., C.B., M.D.	Aldershot	,, ,, ,, Aldershot Command.
Kenny, W. W., M.B., F.R.C.S.I., K.H.S.	York	,, ,, ,, Northern Command.
Lloyd, O. E. P., V.C., C.B.	Pretoria	,, ,, ,, South Africa.
MacNeece, J. G.	Lucknow	,, ,, ,, 8th (Lucknow) Division.
Sloggett, A. T., C.B., C.M.G.	Poona	,, ,, ,, 6th (Poona) Division.
Trevor, F. W., C.B., M.B. K.H.S.	Simla	,, ,, ,, His Majesty's Forces in India.
Whitehead, H. R., C.B., F.R.C.S.	Salisbury	,, ,, ,, Southern Command.

COLONELS.

Name.	Station.	Appointment.
Anderson, L. E.	Allahabad	P.M.O., Allahabad and Fyzabad Brigade.
Babtie, W., V.C., C.M.G., M.B. (Temp. Surg.-Gen.)	War Office	Deputy Director-General Army Medical Service.
Bedford, W. G. A., C.M.G., M.B.	Hong Kong	P.M.O., South China.
Bruce, Sir D., Knt., C.B., F.R.S., M.B.	London	Expert in Tropical Diseases, Army Medical Advisory Board
Butt, E., F.R.C.S.I.	Calcutta	P.M.O., Presidency and Assam Brigades
Corker, T. M., M.D.	Cairo	P.M.O., Egypt.
Croly, A. E. J.	Dover	A.M.O., Eastern Command.
Culling, J. C.	Chester	Principal Medical Officer, Western Command.
Dodd, J. R., M.B., F.R.C.S. ..	Cork	A.M.O., Irish Command.
Ford, R. W., D.S.O. ..	Tidworth	A.M.O., Southern Command.
Forman, R. H., M.B. ..	Bombay	P.M.O., Bombay Brigade.
Hackett, R. I. D., M.D. ..	India	
Hathaway, H. G.	Portsmouth	A.M.O., Southern Command.
Jennings, R., M.D.	Devonport	A.M.O., ,, ,,
Johnston, H. H., C.B., M.D.	Chatham	A.M.O., Eastern Command.
Kerin, M. W., C.B.	Bareilly	P.M.O. Bareilly, Garhwal and Dehra Dun Brigades.
Lucas, T. J. R., C.B., M.B. ..	Jubbulpore	P.M.O., Jubbulpore and Jhansi Brigades.
Maclean, F. B.	Meerut	P.M.O. 7th (Meerut) Division.
Macpherson, W. G., C.M.G., M.B.	Quetta	P.M.O., 4th (Quetta) Division.
Moberly, H. J. R.	Bangalore	P.M.O., Bangalore and Southern Brigades
Murray, H. W., M.B. ..	Gibraltar	Principal Medical Officer, Gibraltar.
O'Connor, A. P., C. B., F.R.C.S.I.	Colchester	A.M.O., Eastern Command.
O'Donnell, T. J., D.S.O. ..	Karachi	P.M.O., Karachi Brigade.
O'Keeffe, M. W., M.D. ..	War Office	Inspector of Medical Services.
Peterkin, A., M.B.	London	P.M.O., London District.
Porter, R., M.B.	Malta	P.M.O., Malta.
Robinson, G. W.	Cape Town	A.M.O., South Africa.
Robinson, S. C. B.	Peshawar	P.M.O., 1st (Peshawar) Division.
Sawyer, R. H. S., M.B., F.R.C.S.I.	Dublin	A M.O., Irish Command.
Woodhouse, T. P.	Edinburgh	Principal Medical Officer, Scottish Command.

ROYAL ARMY MEDICAL CORPS.

LIEUTENANT-COLONELS.

Name.	Station.	Appointment.	Special Qualifications.
Adams, G. G.	Colaba	Officer in charge Military Hospital	—
Adamson, H. M., M.B. ..	Newcastle	Offi. in ch. Mty. Hosp. and S.M.O. North-Eastern Coast Defences	
Aldridge, A. R., M.B. ..	Aldershot	Instructor, School of Army Sanitation	2.
Allen, S. G.	Gibraltar		2.
Austin, H. W.	Deepcut	Officer in charge Detention Hospital	—
Baker, W. J.		On way home from Egypt ..	
Barefoot, G. H.	Ramkhet	Officer in charge Military Hospital	—
Barratt, H. J.	Straits Settlements ..	Senior Medical Officer and O.C. 32nd Company R.A.M.C.	2.
Bate, A. L. F.	Rawal Pindi, ...		—
Beevor, W. C., C.M.G., M.B.	Bangalore	Officer in charge Military Hosp.	—
Berryman, W. E... ..		(Sick Leave)	—
Birrell, W. G., M.B. ..	Woolwich	A.M.O., Eastern Command, and in charge Royal Herbert Hospital, and O.C. 12th and 34th Coys. R.A.M.C.	—
Birt, C.	Dublin	Officer in charge Royal Infirmary and O.C. 14th Company R.A.M.C.	—
Blackwell, C. T., M.D. ..	Madras	Officer in charge Military Hospital	2.
Bond, R. P.	Chatham	Officer in charge Military Hospital, O.C. 10th Coy. R.A.M.C., and S.M.O. Eastern Coast Defences	—
Braddell, M. O'D., M.B.	Rawal Pindi	Officer in charge Military Hospital	—
Brazier-Creagh, G. W., C.M.G.	Lichfield	,, ,, ,, ,,	—
Brown, H. H., M.B. ..	Rawal Pindi		—
Burtchaell, C. H., M.B...	War Office	Assistant Director-General, Army Medical Service	2.
Burton, F. H. M., M.D...	Colchester	Officer in charge Military Hospital and O.C. 9th Coy. R.A.M.C.	—
Caldwell, R., F.R.C.S. ..	Pretoria	Sanitary Officer, Pretoria, Potchefstroom, and Natal	2.
Carr, H., M.D.	Jullundur	Officer in charge Military Hospital	—
Clarkson, T. H. F. ..	London	Medical Officer of the Tower ..	—
Cocks, H., M.B.	Woolwich		—
Cottell, R. J. C.	Chelsea	Physician and Surgeon Royal Hosp.	8.
Cree, G.	London	Medical Inspector of Recruits, Eastern Command	—
Cree, H. E.	Jhansi	Officer in charge Military Hospital	—
Daly, J. H.	Limerick	,, ,, ,, ,,	—
Daly, T.	Dalhousie	Offi. in ch. Mty. and Cant. Hosp.	—
Davidson, J. S., M.B. ..	Allahabad	Officer in charge Military Hospital	—
Dick, W., M.B., F.R.C.S.Ed.	Woolwich		2.
Dodd, A.	Chester	Offi. in ch. Mty. Hosp., O.C. 19th Coy. R.A.M.C., and S.M.O. North-Western Coast Defences	—
Donaldson, J.	Aldershot	Offi. in charge Isolation Hospital	-
Donegan, J. F.	Parkhurst	,, ,, Military Hosp. ..	
Donnet, J. J. C.	Belfast	,, ,, ,, ,, and O.C. 15th Coy. R.A.M.C.	—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Eckersley, E., M.B. ..	War Office	Deputy Assistant Director-General, Army Medical Service	2.
Elkington, H. P. G. ..	Exeter	Officer in charge Military Hospital	2.
Fallon, J.	Preston	,, ,, ,, ,,	—
Faunce, C. E.	Gibraltar	,, ,, ,, ,, and O.C. 28th Coy. R.A.M.C.	—
Fayrer, Sir J., Bt., M.D., F.R.C.S.Edin.	Hong Kong	Officer in charge Military Hospital, Victoria, and O.C. 27th Coy. R.A.M.C.	—
Ferguson, N. C., C.M.G., M.B.	London	Q. A. Military Hospital	2.
Firth, R. H., F.R.C.S. (Brevet-Colonel)	Simla	Sanitary Officer, Army Headquarters	2.
Fletcher, H. J., M.B. ..	Sialkot	Officer in charge Military Hospital	—
Forrest, J. R.	Tipperary	,, ,, ,, ,,	2.
Geddes, R.J., D.S.O., M.B.	Jubbulpore	,, ,, ,, ,,	2.
Gerrard, J. J., M.B. ..	York	Medical Inspector of Recruits N.C.	—
Gordon, P. C. H. ..	Pembroke Dock	Officer in charge Military Hospital and S.M.O. Western Coast Defences	2.
Gordon-Hall, F.W.G., M.B.	Glasgow		—
Green, J. S., M.B. ..	Naini Tal	Officer in charge Military Hospital,	—
Gubbin, G. F.	Curragh	,, ,, ,, ,, and O.C. 17th Coy. R.A.M.C.	—
Haines, H. A., M.D. ..	Portsmouth	Officer in charge Reception Hosp.	—
Hale, G. E., D.S.O. ..	India		—
Hall, R. H., M.D. ..	Bermuda	S.M.O., O.C. R.A.M.C., and in charge Military Hospital	—
Hamilton, T. W. O'H., C.M.G., M.B.	Warley	Officer in charge Military Hospital	—
Hanley, R. G., M.B. ..	Dublin	Officer in charge Military Hospital Portobello (for S. Africa)	—
Hearn, M. L.	Dublin	Medical Inspector of Recruits Irish Command	—
Henderson, R. S. F., K.H.P., M.B. (Brevet-Colonel)	Simla	Sec. to P.M.O., H.M.'s Forces in India	—
Hennessy, D., M.D. ..	Ahmednagar		—
Heuston, F. S., C.M.G., F.R.C.S.I.	Edinburgh	Offi. in charge Military Hospital, O.C. 13th Coy. R.A.M.C., and S.M.O. Scottish Coast Defences	—
Hickson, S., M.B. ..	Wynberg		—
Holyoake, R.	Sheerness	Officer in charge Military Hospital	—
Hunter, G. D., D.S.O. ..	Aldershot	O.C. Depôt, School of Instruction, and in charge of Records, R.A.M.C.	—
Irwin, J. M., M.B. ..	Tientsin	Senior Medical Officer and O.C. R.A.M.C., North China	—
Jencken, F. J., M.B. ..	Netley	Offi. in ch. Royal Victoria Hosp., and O.C. 4th, 5th, and 21st Coys. R.A.M.C.	2.
Johnson, C. W., M.B. ..	Cosham		—
Jones, F. W. C., M.B. ..	Quetta	Officer in charge Military Hospital	—
Kennedy, A.	Netley	Offi. in charge "D" Block ..	—
Kirkpatrick, R., C.M.G., M.D.	Devonport	,, ,, Mty. Hosp., O.C. 7th Coy. R.A.M.C., and S.M.O. South Western Coast Defences	—

Special Qualifications.

1. State Medicine
2. Diploma in Public Health
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Knaggs, H. T., M.B. ..	Alexandria	Officer in charge Military Hospital	2.
Lambkin, F. J. (Bt. Colonel)	Bloemfontein	,, ,, ,, ,, and O.C. 24th Coy. R.A.M.C.	— —
Lane, C. A., M.B. ..	Hounslow	Officer in charge Military Hospital	—
Lavie, T. G.	Queenstown	,, ,, ,, ,,	—
Le Quesne, F. S., V.C. ..	Woolwich	,, ,, Auxiliary Hospital	—
Lilly, A. T. I.	Bolgaum	Officer in charge Military Hospital	—
Lynden-Bell, E. H. L., M.B.	Meerut	,, ,, ,, ,,	—
MacDonald, C. J., M.D...	Fermoy	,, ,, ,, ,,	—
McGill, H. S.	Secunderabad	,, ,, ,, ,,	2. 9.
Macleod, R. L. R., M.B.	Aden	,, ,, ,, ,,	2.
Maher, J.	London	,, ,, Queen Alexandra Military Hospital and O.C. 35th Coy. R.A.M.C.	—
Manders, N.	Ceylon	S.M.O., in ch. Mty. Hosp. Colombo, and O.C. 26th Coy. R.A.M.C.	—
Marks, G. F. H., M.D. ..	Ferozepore	Officer in charge Military Hospital	—
Mathias, H. B., D.S.O. .. (local Colonel)	Egypt	P.M.O. Egyptian Army	
Meek, J., M.D.	Cosham	Offi. in ch. Mty. Hosp., O.C. 6th Coy. R.A.M.C., and S.M.O. Southern Coast Defences.	2.
Melville, C. H., M.B. ..	R.A.M. College	Professor of Hygiene	2.
Moore, R. R. H., M.D. ..	Belfast	A.M.O. Irish Command, and S.M.O. North Irish Coast Defences	—
Morris, A. E., M.D. ..	Cork	Officer in charge Military Hospital, O.C. 16th Coy. R.A.M.C., and S.M.O. South Irish Coast Defences	—
Morris, W. A.	Cawnpore	Officer in charge Military Hospital	—
Nash, L. T. M	Karachi	,, ,, ,, ,,	—
Newland, F. R., M.B. ..	York	Staff Officer to P.M.O. Northern Command	—
Nichol, C. E., D.S.O., M.B.	Maymyo	Officer in charge Military Hospital	—
Nichols, F. P., M.B. ..	Jersey	S.M.O. and in charge Military Hosp., Fort Regent	—
Noding, T. E.	Hilsea	Officer in charge Military Hospital	—
O'Callaghan, D. M. ..	Aldershot	,, ,, Surgical Wards, Cambridge Hospital	—
O'Connell, D. V., M.D. ..	Shorncliffe	Officer in charge Military Hospital	2.
O'Halloran, M., M.D. ..	Canterbury	,, ,, ,, ,,	—
Penton, R. H., D.S.O. ..	Poona	,, ,, ,, ,,	2.
Philson, S. C.	Bareilly	,, ,, ,, ,,	—
Pike, W. W., D.S.O., F.R.C.S.I.	Tidworth	Under orders for Egypt	—
Powell, S., M.D. ..	Rangoon	Officer in charge Military Hospital	—
Reade, W. L.	Mauritius	Senior Medical Officer and O.C. 31st Coy. R.A.M.C.	—
Reilly, C. C.	Sandhurst	Surgeon Royal Military College..	—
Rhodes, J. H. A.	Tralee	Officer in charge Military Hospital	—
Risk, E. J. E.	R.A.M. College	Commandant and Director of Studies	—
Rowan, H. D., M.B. ..	Tidworth	Officer in charge Military Hosp. and O.C. 20th Coy. R.A.M.C.	—
Russell, A. F., C.M.G., M.B.	Malta	Officer in charge Military Hospital, Cottonera, and O.C. 30th Company R.A.M.C.	—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Russell, J. J., M.B. ..	Salisbury	Staff Officer to P.M.O. Southern Command	—
Russell, M. W.	London	Staff Officer to P.M.O. Eastern Command	—
Salvage, J. V., M.D. ..	Muttra	Officer in charge Military Hospital	2.
Saunders, D. M., M.D. ..	Ballincollig	,, ,, ,, ,,	2.
Sexton, M. J., M.D. ..	Dublin	,, ,, ,, ,, Arbor Hill	—
Shine, J. M. F., M.D. ..	Fyzabad	Officer in charge Military Hospital	—
Simpson, R. J. S., C.M.G., M.B.	Woolwich	,, ,, Medical Division, Royal Herbert Hospital	—
Skinner, B. M., M.V.O. ..	Rawal Pindi	Officer in charge Military Hospital	—
Sloggett, H. M.	Aldershot	,, ,, Connaught Hosp., and O.C. No. 2 Coy. R.A.M.C.	—
Starr, W. H.	Shwebo	Officer in charge Military Hospital	—
Sutton, A. A., D.S.O. ..	West Africa	Senior Medical Officer	—
Swan, W. T., M.B. ..	Netley	Officer in charge Medical Division	—
Tate, A. E.	Ambala	Officer in charge Military Hospital	—
Thompson, H. N., D.S.O., M.B.	Lucknow	,, ,, ,, ,,	—
Thomson, W. B.	Calcutta	,, ,, ,, ,,	—
Treherne, F. H., F.R.C.S. Edin.	Aldershot	Offi. in charge Cambridge Hosp. and O.C. Nos. 1 and 3 Coys. R.A.M.C.	2.
Trevor, H. O.	Jamaica	Senior Medical Officer and O.C. 29th Coy. R.A.M.C.	—
Turner, W.	York	Offi. in charge Military Hospital, and O.C. 8th Coy. R.A.M.C.	—
Tyrrell, C. R.	Bordon	A.M.O. Aldershot Command ..	—
Westcott, S., C.M.G. ..	Chakrata	Officer in charge Military Hospital	2.
Whaite, T. Du B., M.B. ..	Woolwich	Senior Medical Offi., Royal Arsenal	—
White, H. L. E.	Malta	Offi. in ch. Military Hosp., Forrest	—
Will, J., M.B.	Kinsale	Officer in charge Military Hospital	—
Wills, S. R.	Agra	,, ,, ,, ,,	—
Wilson, G., M.B.	Dover	,, ,, ,, ,, O.C. 11th Coy. R.A.M.C., and S.M.O. South Eastern Coast Defences	—
Wilson, J. B., M.D. ..	Woolwich	Officer in charge Surgical Division, Royal Herbert Hospital	—
Windle, R. J., M.B. ..	Dublin	Physician and Surgeon Royal Hospital, Kilmainham, and Medical Officer Royal Hibernian School	—
Winter, T. B.	London	S.M.O. Recruiting, St. George's Barracks	2.
Wright, R. W.	Shoeburyness		—
Yarr, M. T., F.R.C.S.I. ..	Edinburgh	Medical Inspector of Recruits, Scottish Command	7.

MAJORS.

Addams-Williams, L. ..	Tidworth	Company Officer	—
Alexander, J. D., M.B. ..	Thayetmyo	Officer in charge Military Hospital	—
Anderson, E. C., D.S.O. ..	Rawal Pindi		—
Anderson, J. B.	Southampton	Embarkation Medical Officer ..	3.
Archer, G. J. S., M.B. ..	Secunderabad		5.

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pediatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment	Special Qualifications.
Archer, S. A.	Jullundur	Staff Surgeon and in Civil Medical charge Cantonment	7.
Ashe, F.	Secunderabad	Spec. in Midwifery and Diseases of Women and Children	8.
Austin, J. H. E.	London	Recruiting Duties	—
Austin, R. F. E.	Kasauli		—
Barnett, K. B., M.B., F.R.C.S.I.	Shorncliffe..		12.
Barrow, H. P. W. ..	Jamaica	Sanitary Officer	2.3.9.
Beach, T. B.	Cairo	Officer in charge Abbassiyeh ..	—
Begbie, F. W.	Colchester		—
Berryman, H. A.	Chester		10.
Beveridge, W. W. O., D.S.O., M.B.	London District	Offi. in ch. Kensington Barracks, and Specialist in Sanitation.	2.
Bewley, A. W.	Meerut		—
Beyts, W. G.	India		—
Birrell, E. T. F., M.B. ..	War Office..	Deputy Assistant Director General Army Medical Service	7.
Blackham, R. J.	Peshawar	Sanitary Officer, 1st Division ..	2.8.
Blenkinsop, A. P. (Brevet Lieutenant-Colonel)	R.A.M. College	Assistant to Commandant and O.C. Det. R.A.M C.	—
Bliss, E. W.	Mhow	Offi. in charge Mil. Hosp., Spec. in Advanced Operative Surgery	5.
Bourke, E. A.	Cape Town	Embarkation Medical Officer ..	2.15.
Bowen, A. W. N.	Kirkee		—
Boyle, M., M.B.	Leeds	Officer in charge Military Hospital	10.
Brakenbridge, F. J. ..	R A M. College		2.
Bray, G. A. T.	Maidstone	Officer in charge Military Hospital	—
Bray, H. A.	Woolwich		—
Brodribb, E.	Hythe	Officer in charge Military Hospital, Specialist in Ophthalmology	7.
Brogden, J. E.	Gibraltar	Company Officer	—
Browne, E. G.	Delhi	Officer in charge Military Hospital	2.
Browne-Mason, H. O. B...	Poona	Officiating Staff Offi. for Medical Mobilisation Stores 6th Division	4.
Buchanan, G. J., M.B. ..	Agra		—
Buist, H. J. M., D.S.O., M.B.	Pretoria		—
Buist, John. M., M.B. ..	Netley		2.3.9.
Bullon, J. W., M.D. ..	Wellington	Officer in charge Military Hospital	2.
Burnside, E. A.	Golden Hill	" " " "	—
Buswell, F. R.	Kamptee	" " " "	—
Campbell, J. H., D.S.O.	London	Recruiting Duties	8.
Carroll, F. F., M.B. ..	Egypt	Egyptian Army	5.
Carter, G. B., M.B. ..	India		—
Carter, J. E., M.B. ..	Chatham	Company Officer	2.
Chambers, A. J.	Pretoria	Staff Officer to P.M.O., S. Africa	—
Clark, E. S., M.B. ..	Belfast		15.
Clark, S. F., M.B. ..	Chester	Sanitary Officer Western Command	2.
Clarke, T. H. M., C.M.G., D.S.O., M.B.	Salisbury	Medical Inspector of Recruits Southern Command	—
Clements, R. W., M.B. ..	Wellington	Sanitary Officer, 9th Division ..	2.9.10.
Cochrane, E. W. W., M.B.	Bermuda	Sanitary Officer	2.3.
Collingwood, P. H. ..	Devonport		—
Collins, D. J., M.D. ..	Dublin	Specialist in Ophthalmology ..	2.7.
Condon, E. H., M.B. ..	Cardiff	Officer in charge Military Hospital	—
Connor, J. C., M.B. ..	Bangalore		—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Paediatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications
Copeland, R. J., M.B. ..	Darjeeling	Officer in charge Military Hospital	—
Corkery, M. P.	Mount Abu	,, ,, ,, ,, also in Medical charge Lawrence School, and Residency Surgeon	1.
Cowan, J., M.B.	Woolwich	Clinical Pathologist	3.
Crawford, G. S., M.D. ..		On way home from Malta ..	2.9.
Crawford, V. J.	Mauritius	Officer in ch. Mil. Families' Hosp. Curepipe	8.
Crisp, G. B.	Mhow	Staff Offi. for Med. Mobilistn. Stores	—
Cummins, S. L., M.B. ..	R.A.M. College		3.9.
Curme, D. E.	Ewshot	Officer in charge Detention Hosp.	—
Dalton, C.	Dublin	Staff Offi. to P.M.O. Irish Command	—
Dansey-Browning, G. ..	Aldershot	Assistant Sanitary Officer ..	2.9
Dunn, H. N., M.B. ..	Dagshai	Offi. in ch. Mil. and Cantmt. Hosp.	—
Elliott, C. R., M.D. ..	Lahore	San. Officer, 3rd (Lahore) Division	2.
Ensor, H., D.S.O., M.B.	Egypt	Egyptian Army	3.
Erskine, W. D., M.B. ..	Glasgow	Staff Officer to A.M.O., Lowland Division T.F.	—
Evans, P., M.B.	Devonport	Spec. in Advanced Operative Surg.	2.5.15.
Faichnie, F. G.	London District	Officer in charge Chelsea Barracks	—
Faichnie, N., M.B. ..	Mhow	Divisional Sanitary Officer ..	2.9.
Fairrie, S. H., M.B. ..	Shoeburyness	Officer in charge Military Hospital	8.
Fell, M. H. G.	Cairo	Sanitary Officer	2.9.
Ferguson, J. D., D.S.O. ..	London	Recruiting Duties	—
Fleury, C. M.	Hong Kong	Offi. in ch. Mil. Hosp., Kowloon	10.
Forde, B., M.B.	Aldershot		2.
Forrest, J. V., M.B. ..	Cairo	Company Officer	—
Fowler, C. E. P., F.R.C.S.	Gibraltar	Sanitary Officer	2.7.
Fox, A. C.	Tientsin	Officer in ch. Mil. Hosp.	8.
French, H. C.	Malta	,, ,, ,, Imtarfa	2.4.
Fuhr, R. S. H., D.S.O. ..	Woolwich	Officer in ch. Mil. Families' Hosp.	8.
Gallie, J. S.	Ahmednagar	Specialist in Dermatology ..	—
Gibbard, T. W., M.B. ..	London	Officer in charge Military Hospital, Rochester Row, Lecturer in Syphilology R.A.M. College, and O.C. 18th Coy. R.A.M.C.	7.
Gill, J. G.	Peshawar	Spec. in Ophthalmology, 1st Div.	—
Girvin, J.	Deolali	Officer in charge Military Hospital	—
Goddard, G. H.	Shorncliffe	,, ,, "Helena" Families' Hospital	8.
Goldsmith, G. M., M.B. ..	Maymyo	Staff Surgeoncy Burma Division	—
Goodwin, T. H. J. C., D.S.O.	Quetta	Specialist in Advanced Operative Surgery	5.10.
Graham, W. A. S. J. ..	Nowgong	Offi. in ch. Military Hospital, also Agency Surgeon Bundelkhand	—
Grattan, H. W.	Lucknow	Sanitary Officer 8th Division ..	2.3.
Gray, W. L., M.B. ..	Winchester	Officer in charge Military Hospital	2.
Grech, J.	Warrington	,, ,, ,, ,,	10.
Green, S. F. St. D., M.B.	Aldershot	.. ,, Louise Margaret Hospital	8.
Gunter, F. E., M.B. ..	Lucknow	Specialist in Advanced Operative Surgery 8th Division.	5.
Gwynn, W. P.	Karachi	Embarkation Medical Officer ..	—
Hale, C. H., D.S.O. ..	India		—
Hall, R. J. D.	Jamaica	Officer in charge Military Hosp. and O.C. 29th Co. R.A.M.C.	—
Hall, S. O.	Fermoy	Anæsthetist	8.

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications
Hallaran, W., M.B. ..	Lahore		—
Hardy, F. W., M.B. ..	Colchester	San. Offi. Area North of Thames..	2.
Hardy, W. E.	Caterham	Officer in charge Military Hospital	—
Harrison, W. S., M.B. ..	R.A.M. College	Professor of Tropical Medicine ..	3.
Harvey, D., M.B. ..	Naini Tal	In ch. Enteric Convalescent Depôt, Spec. in Prevention of Disease	1.
Hassard, E. M.	Lahore	Officer in charge Military Hospital	—
Hayes, E. C.	Cosham	Sanitary Officer Portsmouth Dist.	2.7.
Healey, C. W. R.	Nasirabad	Officer in charge Military Hospital	—
Healy, C. J., M.B. ..	Fermoy		—
Heffernan, F. J. C., F.R.C.S.I.	London	Recruiting Duties	—
Hennessy, J., M.B. ..	Poonamallee	Officer in charge Military Hospital	—
Horrick, H.	Hyderabad..	Specialist in Dermatology, Officer in charge Military Hospital	—
Hewetson, H.	Mill Hill	Officer in charge Military Hospital	1.2.
Hewitt, E. P.	Secunderabad		—
Hinge, H. A.	London District	Recruiting Duties	—
Hodgson, J. E.	London District		1.
Holt, M. P. C., D.S.O. ..	Ambala		5.
Hooper, A. W., D.S.O. ..	Shorncliffe		—
Horrocks, W. H., M.B. ..	London District	Expert in Sanitation, Army Medical Advisory Board	2.
Houghton, J. W. H., M.B.	Aldershot		2.
Howell, H. A. L.	London	Med. Offi. R.A.C. Factory, Pimlico	15.
Hudleston, W. E. ..	Portsmouth		2.15.
Humphry, L.	Poona	Specialist in Advanced Oper. Surg.	5.
Inkson, E. T., V.C. ..	Bangalore	Specialist in Dermatology ..	—
Inniss, B. J.	Gravesend	Officer in charge Military Hospital	—
Jameson, J. C., M.B. ..		On way home from Egypt ..	2.
Johnson, H. P., M.R.C.P. Lond.	Bloemfontein		—
Jones, T. P., M.B. ..	Woolwich	Registrar Royal Herbert Hospital	—
Julian, O. R. A., C.M.G. (Brevet.-Lieut.-Col.)		On way home from India ..	2.
Keble, A. E. C.	Gibraltar	Specialist in Midwifery and Officer in charge Garrison Dispensary	2.8.
Kelly, J. F. M., M.B. ..	Potchefstroom		—
Kiddle, F., M.B.	London	Deputy Surgeon R Hosp., Chelsea	7.
Killery, St. J. B.	Jersey	Officer in charge Military Hospital, Elizabeth Castle	—
Lauder, T. C., M.B. ..	Fethard	Officer in charge N.D. Hospital..	2.9.
Lawson, C.B., M.B. ..	Netley	Officer in charge Surgical Division	5.10.
Lawson, D.	Netley	,, ,, Venereal ,,	—
Leake, J. W.	W. Africa	Officer in charge Military Hospital Tower Hill	1.2.
Leishman, Sir W. B., Knt., F.R.S., M.B. (Brevet-Lieut.-Col.)	R.A.M. College	Professor of Pathology	—
Lenehan, T. J., M.B. ..	Seaforth	Officer in charge Military Hospital	—
Lewis, R. C.	Pembroke Dock		—
Lloyd, R. H.	Exeter	Adjutant School of Instruction R.A.M.C. T.F.	—
Longhurst, B. W... ..	Ashton	Officer in charge Military Hospital	16.
Lowsley, M. M.	Ambala	Staff Surgeon and in civil Medical Charge Cantonment.	8.
Luther, A. J.	Cahir	Officer in charge Military Hospital	—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
MacCarthy, I. A. O. ..	Woolwich		—
McCarthy, J. McD., M.B.	India		1.2 9.
McCulloch, T., M.B. ..	Mandalay	Officer in charge Military Hospital	—
McDermott, T., M.B. ..	Woolwich	Specialist in Ophthalmology ..	7.
Macdonald, S., M.B. ..	London	Recruiting Duties	—
MacDougall, A. J., M.B.	Ceylon	Sanitary Officer	3.
McKessack, P., M.B. ..	Mauritius	Officer in charge N.D. Hospital, Vaccas, Sanitary Officer	2.3.
McLoughlin, G. S., D.S.O., M.B.	Chester	Medical Inspector of Recruits, Western Command	—
McMunn, J. R.	Netley	Registrar and Company Officer ..	15.
McNaught, J. G., M.D. ..	Cape Town	Sanitary Offi. Cape Good Hope and Orange Free States Districts	2.
Macpherson, J. D. G., M.B.	Pachmarhi	Officer in charge Military and Cantonment Hospital	–
Mainprise, C. W.	Rawal Pindi		—
Mangin, F. M.	Aldershot	In ch. Medical Wards Cambridge Hosp., Spec. in Ophthalmology	7.
Mansfield, G. S., M.B. .	Norwich	Officer in charge Military Hospital	– –
Marder, N.	Cosham		– –
Marriott, E. W. P. V. ..	Gibraltar		10.
Martin, C. B., M.B. ..	Netley		—
Martin, H. G.	Calcutta		8.
Master, A. E., M.B. ..	Woolwich	Medical Officer Royal Arsenal ..	14.
Maurice, G. T. K. ..	Bulford		12.
Mawhinny, R. J. W. ..	Athlone	Officer in charge Military Hospital	2.
Milner, A. E.	Birmingham		10.
Mitchell, L. A., M.B. ..	Woking	Officer in charge Mil. Hosp. ..	-
Moore, G. A., M.D. ..	Chatham	„ „ „ Fam. Hosp., and Specialist in Otology	14.
Moores, S. G.	Aldershot	Staff Officer to P.M.O. Aldershot Command	2.
More, L. P., M.B. ..	Rawal, Pindi		—
Morgan, C. K., M.B. ..	Aldershot	Instructor, Training School ..	10.
Morgan, F. J.	Barrackpore	Officer in charge Military Hospital	—
Morgan, J. C.	Dublin	Sanitary Officer Dublin District	2.
Morphow, E. M.	Roorkee	Officer in charge Military Hospital	—
Morris, A. H.	Malta	Sanitary Officer	2.3.
Mould, W. T.	Dover	Company Officer	—
Nickerson, W. H. S., V.C., M.B.	India		2.3.
Norrington, H. L. W. ..	Malta		8.
O'Flaherty, A. R. ..	Devonport		—
O'Gorman, C. J., D.S.O.	Peshawar		—
O'Grady, S. de C., M.B. .	Khartoum	Officer in charge Military Hospital	1.
O'Reilly, H. W. H., M.B.	Colchester	Offi. in charge Detention Barracks	—
Ormsby, G. J. A., M.D. ..	Fyzabad	„ „ Cantonment Hosp.	—
Packer, H. D.	Devonport	Pathologist	8.
Palmer, H. K.	Colaba		—
Parker, L. E. L.	Poona	Sanitary Officer 6th Division ..	2.3.
Pearse, A.	Chatham		2.9.
Penny, F. S., M.B. ..	Hong Kong	Sanitary Officer	1.2.
Perry, S. J. C. P., F.R.C.S.I.	Belgaum		10.
Pilcher, E. M., D.S.O., M.B., F.R.C.S.	R.A.M. College	Professor of Military Surgery ..	5.
Pocock, H. I.	Nowshera	Officer in charge Military Hospital	16.

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Poe, J., M.B.	Bloemfontein, ...	Offi. in charge Mil. Families' Hosp. Tempe.	—
Pollock, C. E.	War Office	Deputy Assist. Director General Army Medical Service	4.10.
Poole, W. C., M.B. ..	Rawal Pindi		2.
Porter, F. J. W., D.S.O.	Cosham		—
Powell, E. E.	Bordon	Officer in charge Troops and Reception Station, Longmoor	—
Probyn, P. J., D.S.O., M.B.		(Sick Leave)	2.
Profeit, C. W., M.B. ..	London	Spec. in Otology Military Hosp., Rochester Row	14.
Prynne, H. V.	Woolwich	Royal Military Academy	7.
Rattray, M. MacG., M.B.	Brighton	Officer in charge Military Hospital	—
Rawnsley, G. T.	Manchester	Staff Offi. to A.M.O. East Lanc. Division T.F.	—
Read, H. W. K.	Pontefract		—
Reilly, C. W.	Dum Dum	Officer in charge Military Hospital and Civil Surgeon, also in medical charge Ammunition Factory, Cossipore and Dunkinsore Factories and Cantonment outdoor dispensary.	2.
Riddick, G. B.	Maymyo		—
Ritchie, J., M.B.	Multan	Officer in charge Military Hospital	—
Robinson, O. L.	Meerut		2.
Ross, N. H., M.B. ..	Aldershot	O C. "A" Coy. Depôt R.A.M.C.	3.
Rutherford. N. J. C., M.B.	Wynberg		—
Samman, C. T.	Dinapur	Officer in charge Military Hospital	2.11.
Scott, A. L.	Aldershot		3.
Scott, B. H.	War Office	Deputy Assistant Director General Army Medical Service.	2.
Shanahan, D. D.	Ootacamund	Staff Offi Div M.M. Stores 9th Div.	—
Silver, J. P., M.B. ..	Glasgow	Officer in charge Mil. Hospital ..	—
Slayter, E. W., M.B. ..	Wellington		—
Sloan, J. M., D.S.O., M B.	Aberdeen	Adjutant School of Instruction, R.A.M.C. T.F.	1.
Smith, F., D.S.O. ..	Rawal Pindi	Divisional Sanitary Officer ..	2.
Smith, L. F., M.B. ..	Nowshera	Specialist in prevention of diseases and in charge of Brigade Laboratory	2.15.
Smithson, A. E., M.B.,	Maritzburg		2.9.
Spencer, C. G., M.B., F R.C.S.	York	Specialist in Advanced Operative Surgery	5.
Staddon, H. E.	Curragh		—
Stalkartt, C. E. G., M.D.	Gosport	Officer in charge Mil. Hospital ..	—
Stallard, H. G. F. ..	Delhi		—
Stammers, G. E. F. ..	Quetta	Sanitary Officer 4th Division ..	1.2.
Stanistreet, G. B., M B...	London	Company Officer	—
Statham, J. C. B. ..	London	Clin. Pathologist Q.A. Mty. Hosp.	2.3.9.
Steel, E. B., M.B. ..	Neemuch	Officer in charge Mil. Hosp. and Agency Surgeon, Specialist in Mental Science	11.
Stone, C. A., M.D ..		On way home from India.. ..	—
Swabey, M.	Secunderabad		12.
Sweetnam, S. W... ..	Kirkee	Officer in charge Military Hospital	—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
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6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Symons, F. A., M.B. ..	Ceylon	Officer in charge Military Hospital Nuwara, Eliya	—
Tate, G. W., M.B. ..	Dublin	Recruiting Medical Officer ..	2.9.
Taylor, H. S.	Straits Settlements ..		—
Taylor, W. J., M.B. ..	West Africa		2.10.
Thom, G. St. C., M.B. ..	Sabathu	Officer in charge Military and Cantonment Hospital	13.14.
Thompson, A. G., M.B. ..	Ferozepore		2.
Thomson, J., M.B. ..	Harrismith	Officer in charge Military Hospital	—
Thorp, A. E.	Pretoria		—
Thurston, H. C., C.M.G. ..	Bermuda	Officer in charge Military Hospital, St. George's	—
Thurston, H. S.	Malta		—
Tibbits, W., M.B. ..	Chatham	Offi. in charge Casualty Hospital	—
Tyacke, N.	Devonport		—
Tyrrell, A. F.	Cork		—
Wade-Brown, F. J. ..	Cork		—
Walton, H. B. G. .	Bareilly		2.3.
Wanhill, C. F.	R.A.M. College	Assistant Professor of Hygiene ..	2.3.
Ward, W. A. . .	Bulford	Specialist in Dermatology ..	4.
Waring, A. H.	Portland	Officer in charge Mil. Hospital ..	10.
Watts, B.	Meerut	Specialist in Midwifery	2.8.
Way, L.	Cosham	Company Officer	—
Webb, A. L. A.	West Africa	Sanitary Officer	1.2.9.
Weld, A. E.	Malta	Officer in charge Military Families' Hospital, Valletta	8.
Whitestone, C. W. H., M.B.	Peshawar	Staff Officer for Medical Mobilisation Store, 1st Division	—
Williams, E. M.	Calcutta	In medical charge Garrison Dispensary Fort William, Dep. Followers Hosp. Hastings and Staff-Surgeon. Spec. in Midwifery and Diseases of Women and Children, 8th Division	8.
Williams, E. McK. ..	Sheffield	Officer in charge Mil. Hospital ..	—
Winkfield, W. B. ..	Agra		—
Winter, H. E.	Gravesend		—
Withers, S. H., M.B. ..	Ambala		—
Wroughton, A. O. B. ..	Hilsea	Specialist in Dermatology ..	4.
Young, A. H. O.	Halifax	Officer in charge Mil. Hospital ..	—
Young, C. A.	Shrewsbury	Staff Officer to A.M.O.. Welsh Division T.F.	—

CAPTAINS.

Adderley, A. C.	Harrismith		—
Adye-Curran, S. M. ..	Sialkot	Specialist in Prevention of Disease	2.
Adye-Curran, W. J. P. ..	Cosham	,, Advanced Opera. Surg.	5.
Ahern, D.	Alexandria		—
Ahern, M. D.	R.A.M. College		—
Ainsworth, R. B.	Tidworth	Sanitary Offi. Tidworth District	2.3.
Amy, A. C., M.B. ..	Meerut	Spec. in Electric. Science 7th. Div.	—
Anderson, H. S.	Buttevant	Officer in charge Mil. Hospital ..	—
Anderson, J. A., M.B. ..	Bloemfontein		9.
Anderson, R. G.	Egypt	Egyptian Army	—
Andrews, L. A. A. ..	Mauritius		—

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1. State Medicine.
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8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery

Name.	Station.	Appointment.	Special Qualifications.
Anthonisz, E. G.	Bangalore		—
Archibald, R. G., M.B. ..	Egypt	Egyptian Army	—
Argles, R. L.	Ferozepore	Staff Surgeon and in medical charge Ordnance Dept.	—
Arthur, A. S., M.B. ..	Edinburgh	Company Officer	—
Aviss, W. G.		On way home from India ..	—
Aylen, E. V.	Nowshera	Officer in charge Cantonment General Hosp. and Specialist in Dermatology, 1st Division	4.
Babington, M. H. ..	Malta	Clinical Pathologist	3.
Bagshawe, H. V.	Sheffield		1.
Baillie, G., M. B.	W. Africa		—
Baker, W. L.	Malta	Specialist in Ophthalmology and Company Officer	7.
Balck, C. A. J. A., M.B.	Curragh	Specialist in Physical Training ..	6.
Barbour, J. H., M.B. ..	Jubbulpore	In medical charge Gun Carriage Factory	—
Bartlett, B. S.	Multan		—
Bateman, H. R.	London		3.
Beadnell, H. O. M. ..		(Sick Leave)	—
Beaman, W. K.	Malta		—
Beatty, M. C., M.B. ..	Tregantle	Officer in charge Mil. Hospital ..	2.
Bell, J. G., M.B.	R.A.M. College		2.
Bell, W. J. E., M.B. ..	Hong Kong		—
Benett, A. M.	Jubbulpore	Staff Surgeon	—
Bennett, E.	Derby	Adjutant School of Instruction R.A.M.C. T.F.	—
Bennett, J. A., M.B. ..	Mhow		—
Bennett, W., M. B. ..	Calcutta	In charge Bde. Laboratory, Spec. in Prevention of Disease	1.
Bennett, W. L., M.B. F.R.C.S.Edin. ..	Bermuda		—
Benson, W., M.B. ..	Rawal Pindi	Officer in charge Cant. Genl. Hosp.	—
Biggam, T., M.B. ..	Aldershot		—
Black, R. B., M.B. ..	R.A.M. College		—
Blackwell, T. S.	Bhamo		—
Blackwell, W. R.	Lucknow	Staff Surgeon	—
Bond, A. H.	Bareilly		—
Bond, J. H. R.	Mhow		—
Booth, E. B., M.D. ..	Irish Command		—
Bostock, J. S., M.B. ..	Aldershot		—
Bousfield, L., M.D. ..	Devonport		—
Bowle, C. W.	Multan		—
Bowle, S. C.	Winchester		16.
Boyce, W. W.	Lahore		—
Boyd, J. E. M.	Ferozepore		—
Bracken, G. P. A. ..	Secunderabad		—
Bradish, F. L.	Jullundur		—
Bramhall, C.	R.A.M. College		—
Bransbury, H. A.	Woolwich	Specialist in Dermatology ..	4.
Bridges, R. H.	R.A.M. College		—
Brown, G. H. J., M.B. ..	Northern Command ..		—
Brown, R. T., M.D. ..	Maymyo	Divisional Sanitary Officer ..	2.3.
Browne, C. G.	Lucknow	Specialist in Dermatology, 8th Division	—
Browne, T. W.	Kamptee		—
Browne, W. W.	Colchester	Specialist in Physical Training ..	2.6.

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Brunskill, J. H., M.B. ..	R.A.M. College		—
Bryden, R. A.	Bloemfontein		—
Buchanan, R. J. B. ..	R.A.M. College		2.
Burke, B. B.	West Africa	Offi. in charge Mil. Hosp. Mabanta	13.
Butler, S. G.	Pretoria	Specialist in Advanced Operative Surgery	5.
Byam, W.	Egypt	Egyptian Army	—
Byatt, H. V. B.	Poona		—
Caddell, E. D., M.B. ..	Ambala		—
Cahill, R. J., M.B. ..	Curragh		—
Campbell, J. H., M.B. ..		On way home from India	2.
Carlyon, A. F.	Devonport		—
Carmichael, D. G., M.B.	R.A.M. College		—
Carmichael, J. C. G., M.B.	R.A.M. College		—
Carr, C. H., M.D. ..	Tidworth	Specialist in Dental Surgery ..	16.
Carruthers, V. T., M.B., F.R.C.S.Edin.	Ceylon	Officer in charge Military Hospital, Kandy	—
Carson, H. W., M.B. ..	Peshawar		—
Carter, H. St. M., M.D..	Aldershot	Company Offi. Nos. 1 and 3 Coys.	—
Casement, F., M.B. ..	Lucknow		—
Cassidy, C.	Egypt	Egyptian Army	—
Cathcart, G. E.	Preston		—
Chapman, F. H. M. ..	Calcutta		—
Chopping, A.	Peshawar	Staff-Surgeon	—
Churchill, G. B. F. ..	Meiktila	Officer in charge Military Hospital	—
Churton, J. G.	Peshawar	Specialist in Advanced Operative Surgery, 1st Division	5.
Clarke, F. A. H.	Fort George	Officer in charge Military Hospital	1.
Clarke, J. B., M.B. ..		(West African Leave)	5.
Coates, T. S., M.B. ..	Woolwich	Medical Officer, Royal Arsenal ..	—
Collins, R. T.	Woolwich		—
Connell, H. B.	West Africa	Officer in charge Military Hospital, Wonkufu	—
Connolly, E. P.	Cardiff	Adjutant School of Instruction, R.A.M.C. T.F.	—
Conway, J. M. H., F.R.C.S.I.	Dublin		—
Conyngham, C. A. T., M.B.	Quetta		—
Cooke, O. C. P.	Deolali	Offi. in charge Cantonment Hosp.	—
Corbett, D. M., M.B. ..	Ambala		—
Cordner, R. H. L. ..	Rawal Pindi	Staff-Surgeon "A" and in charge Military Families Hospital	—
Cotterill, L.	Aldershot	O.C. "C" Coy. Depôt, R.A.M.C.	1.
Cotton, F. W.	Fleetwood	Officer in charge Military Hospital	—
Coutts, D., M.B.	Allahabad		—
Cowey, R. V.	Tidworth	Offi. in ch. Mty. Families' Hosp.	8.
Craig, B. A.	Hong Kong		—
Crawford, J. M. M. F.R.C.S.I.	R.A.M. College		—
Croly, W. C.	India		—
Cromie, M. J.	Delhi		—
Crossley, H. J.	Richmond, York	Officer in charge Military Hospital	—
Crosthwait, W. S.	Fermoy		—
Cumming, C. C., M.B. ..	R.A.M. College		3.
Cummins, A. G., M.B. ..	Egypt	Egyptian Army	—
Cunningham, R. A., M.B.	Agra		2.
Cuthbert, J. M., M.B. ..	Edinburgh	Pathologist and Recruiting duties	3.

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Davidson, H. A., M.B. ..	Curragh	Company Officer	2.
Davidson, P., D.S.O., M.B.	R.A.M. College		—
Davis, W.	Bareilly	Staff-Surgeon	—
Davy, P. C. T., M.B. ..	Jutogh	Officer in charge Military Hospital	—
Dawson, A., M.B. ..	Wellington		—
Dawson, F. W. W., M.B.	India	(On voyage out)	—
Dawson, G. F., M.B. ..	Meerut		—
De la Cour, G., M.B. ..	Bangalore		—
Delap, G. G., D.S.O. ..	Aldershot	Assist. Instructor, Training School, and O.C. "B" Coy. Depôt, R.A.M.C.	—
Dennis, B. R., M.B. ..	Straits Settlements ..	Officer in charge Military Hospital and O.C. 32nd Coy. R.A.M.C., Bacteriologist and Sanitary Officer	3.
Denyer, C. H.	Jubbulpore	Specialist in Dermatology ..	—
Dickenson, R. F. O'T. ..	Jhansi	In charge Brigade Laboratory ..	2.
Dickson, H. S.	Gibraltar		—
Dill, M. G., M.D.	R.A.M. College		—
Doig, K. A. C.	Hilsea		—
Dorgan, J., M.B.	Cork	Sanitary Officer Cork District ..	1.2.9.
Douglas, H. E. M., V.C., D.S.O.	Woolwich		2.
Douglass, J. H., M.D. ..	Dublin		2.
Douglass, P. C.	Weedon	Officer in charge Military Hospital	—
Dowling, F. T., M.B. ..	Nowshera		—
Drew, C. M., M.B. ..	Egypt	Egyptian Army	—
Dudding, T. S.	R.A.M. College		—
Duffey, A. C., M.D. ..	India	(On voyage out)	8.
Duguid, J. H., M.B. ..	Limerick		13.
Dunbar, B. H. V., M.D. ..	R.A.M. College		—
Dunkerton, N. E.	Woolwich		—
Dunne, J. S., F.R.C.S.I. ..	Agra		—
Dwyer, P., M.B.	Aldershot		2.
Easton, P. G.	Aldershot	Duty with Families, Specialist in Midwifery	8.
Edmunds, C. T.	Peshawar		—
Edwards, G. B.	Mauritius	Officer in charge N.D. Hospital, Vacoas	—
Egan, W., M.B.	Rangoon		—
Ellery, E. E.	Cairo	Specialist in Advanced Operative Surgery	5.
Ellery, R. F.	Benares	Officer in charge Military Hospital	—
Elliott, E. J., M.B. ..	Newcastle		—
Elliott, A. C., M.B. ..	Rawal Pindi		—
Ellis, W. F.	Bradford		—
Elsner, O. W. A.	Pretoria		2.
Emerson, H. H. A., M.B.	R.A.M. College		—
Evans, C. R.	York		—
Fairbairn, J., M.B. ..	West Africa		—
Falkner, P. H., F.R.C.S.I.	Bermuda	Officer in charge N.D. Hospital, Watford	—
Falkner, M. W., F.R.C.S.I.	Curragh	Specialist in Advanced Operative Surgery	5.
Farebrother, H. W. ..	Bangalore		—
Farrant, P.	R.A.M. College		—
Fawcett, C. E. W. S., M.B.	Maymyo		—
Fawcett, H. H. J. ..	R.A.M. College		—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Fawcett, R. F. M. ..	Gosport		—
Fawcus, H. B., M.B. ..	Bloemfontein	Officer in charge Clinical Laboratory	1.2.
Ferguson, G. E.	Cyprus	Officer in charge Military Hospital	—
Ffrench, E. G., M.D., F.R.C.S.Edin.	Ahmednagar	Officer in charge Cantonment Hospital	—
Field, S.	Jamaica		—
Fielding, T. E., M.B. ..	Woolwich	Adjutant School of Instruction, R.A.M.C. T.F.	3.
Fitzgerald, FitzG. G. ..	Dover	Medical Officer, Duke of York's Royal Military School	—
Fleming, C. E., M.B. ..	Woolwich		7.
Ford, E. G., M.B. ..	Rawal Pindi		—
Forrest, F...	Bangalore		—
Forsyth, W. H., M.B. ..	Pretoria		9.
Fortescue, A., M.B. ..	Cawnpore	In Medical charge Harness and Saddle Factory	—
Foster, J. G., M.B. ..	Bangalore		—
Foster, J. R.	Mhow	Staff Surgeon and in charge Followers Hospital	—
Foster, R. L. V., M.B. ..	R.A.M. College		—
Foulds, M. F.	Belfast	Specialist in Advanced Operative Surgery	5.
Franklin, R. J.	Queenstown	Officer in charge Fort Camden ..	—
Fraser, A. D., M.B. ..	Uganda	(Seconded under Colonial Office)	—
Fraser, A. N., M.B. ..	Glasgow	Adjutant School of Instruction, R.A.M.C. T.F.	—
Frost, A. T., M.B. ..	Dublin	Specialist in Dermatology ..	4.
Fry, W. B.	Egypt	Egyptian Army	3.
Furnivall, C. H.	Secunderabad		—
Galwey, W. R., M.B. ..	Lahore	Staff Surgeon	2.
Garland, F. J., M.B. ..	Bury	Officer in charge Military Hospital	—
Gater, A. W.	Fermoy		—
Gatt, J. E. H., M.D. ..	Allahabad		—
Gibbon, E., M.B... ..	Egypt	Egyptian Army	—
Gibbon, T. H., M.D. ..		On way home from Malta ..	—
Gibson, A. W.	Gibraltar	Specialist in Advanced Operative Surgery	5.
Gibson, H.	Jhansi		—
Gibson, H. G.	Malta	Officer in charge Section Hospital, Valletta	—
Gibson, L. G.	Amritsar	Officer in charge Military and Cantonment Hospital	—
Gillatt, W. H., M.B. ..	Egypt	Egyptian Army	—
Glanvill, E. M., M.B. ..	R.A.M. College		—
Goodwin, W. R. P. ..	Fyzabad		7.
Gotelee, H. E.	Holywood		2.
Graham, J. H., M.B. ..	Gibraltar		—
Grant, J. F., M.B. ..	Lucknow		—
Grant, M. F.	R.A.M. College		—
Gray, A. C. H., M.B. ..	R.A.M. College		—
Greenwood, A. R. ..	Aldershot	Specialist in Advanced Operative Surgery	5.
Gregg, R. G. S., M.B. ..	Lucknow	In charge "Weir Laboratory" ..	2.
Gurley, J. H.	Kingston-on-Thames ..	Officer in charge Military Hospital	—
Hallowes, R. C., M.B. ..	Dundalk	" " " "	—
Hamerton, A. E., D.S.O.	London		3.

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Paediatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers
16. Dental Surgery

Name.	Station.	Appointment.	Special Qualifications.
Hanafin, J. B., F.R.C.S.I.	Attock	Officer in charge Military Hospital	—
Hanafin, P. J.	R.A.M. College		2.
Harding, D. L., F.R.C.S.I.	Belfast		—
Harding, H., M.B. ..	R.A.M. College		—
Harding, N. E. J., M.B...	W. Africa	Officer in charge Military Hospital, Port Lokkoh	9.
Harrison, L. W., M.B. ..	London	Specialist in Bacteriology, Military Hospital, Rochester Row	3.
Hart, H. P., M.B. ..	Rangoon		—
Hart, J. C., M.B. ..	Peking	Officer in charge Military Hospital	—
Hartigan, J. A., M.B. ..	Malta	Company Officer	—
Harty, T. E.	Woolwich	,, ,, ...	—
Harvey, F...	Devonport	Sanitary Offi. Devonport District	2.3.9.
Harvey, G. A. D... ..	Dover		—
Harvey, W. J. S... ..	Chatham	Offi. in charge Detention Barracks	—
Hastings, A. E. F. ..	Allahabad	Staff Surgeon	—
Hayes, A. H., M.R.C.P. Lond	York	Sanitary Officer	2 3.
Henderson, P. H., M.B...	Portsmouth		1.
Hendry, A., M.B... ..	Mhow		—
Heron, G. W.	Egypt	Civil Public Health Department	—
Heslop, A. H., M.B. ..	Rawal Pindi		—
Hildreth, H. C., F.R.C.S. Edin.	Dublin		—
Hime, H. C. R., M.B. ..	Madras	In charge Bde. Laboratory, Specialist in prevention of disease	2.7.
Hingston, J. C. L. ..	Madras		—
Hoar, J. E.		On way home from India ..	—
Holden, C. W.	Tientsin		2.9.
Hole, R. B., M.B. ..	R.A.M. College		—
Honeybourne, V. C. ..	Mhow		—
Houghton, G. J.	West Africa		—
Howell, F. D. G... ..	Multan		
Howell, H. L.	Ahmednagar	In charge Brigade Laboratory ..	—
Howley, H. E. J. A. ..	Cawnpore		—
Hughes, G. W. G. ..	Egypt	Egyptian Army	—
Hull, A. J...	R.A.M. College		
Humfrey, R. E., M.B. ..	Nasirabad		
Hunt, R. N., M.B. ..	Egypt		—
Hyde, D. O , M.B. ..	Dublin		-
Hyde, P. G., M.B. ..	Dublin		—
Ievers, O., M.B.	Wynberg, ...	Company Officer	—
Irvine, A. E. S.	Simonstown	Officer in charge N.D. Hospital ..	—
Irvine, F. S., M.B. ..	Aldershot	Adjutant Depôt R.A.M.C.	—
Irwin, A. W. A.	Gibraltar		—
Jacob, A H.	Rawal Pindi		—
Jameson, A. D.	Aldershot	Specialist in Dermatology ..	4.
Johnson, B.	Wellington..		
Johnson, J. T., M.D. ..	India		2.
Johnson, V. G.	Nowshera		—
Johnstone, D. P.	Seaforth	Officer in charge Military Hospital	2.9.
Jones, A. E. B., M.D. ..	Maymyo		—
Jones, J. L.	Netley		-
Kavanagh, E. J., M.B. ..	Delhi		
Keane, M...	Meerut	Staff Surgeon	—
Kelly, C., M.B.	Secunderabad		—
Kelly, H. B., M.B. ..	R.A.M. College		—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Kelly, W. D. C., M.B. ..	Dublin	Specialist in Advanced Oper. Surg.	5.
Kempthorne, G. A. ..	Piershill and Leith Fort..	Offi. in medical charge of Troops	—
Kennedy, J. C., M.D. ..	R.A.M. College	Assistant Professor of Pathology..	3 9.
Kiddle, H. H.	,, ,, ...		—
Knox, E. B., M.D. ..	Norwich		2.
Lambelle, F. W., M.B. ..	India		5.
Lambert, F. C.	R.A.M. College		—
Langrishe, J. du P., M.B.	Kirkee		—
Langstaff, J. W.	Aldershot		—
Lathbury, E. B.	Nasirabad	In charge Brigade Laboratory ..	—
Lauder, F. P.	Aldershot		—
Leahy, M. P., M.B. ..	Kirkee		—
Lelean, P. S., F.R.C.S...	Meerut	Sanitary Officer, 7th Div. ..	2.5.
Leslie, R. W. D.	Malta		—
Leslie, T. C. C.	Maritzburg..		—
L'Estrange, E. F. Q ..	Bellary		—
Lewis, R. P.	Wynberg		—
Lewis, R. R.	Aldershot		—
Lewis, S. E., M.B. ..	R.A.M. College		—
Lithgow, E. G. R. ..	Sheerness		
Littlejohns, A. S. ..	Pretoria		—
Lloyd, J. R.	Jubbulpore		—
LLoyd, L. N., D.S.O. ..	London	Adjutant School of Instruction, R.A.M.C.T.F.	—
Lloyd-Jones, P. A., M.B.	Limerick		—
Lochrin, M. J.	Bangalore		—
Long, H. W., M.B. ..		(West African Leave)	—
Loughnan, W. F. M. ..	Bareilly	Spec. in Prevention of Disease ..	2.
Low, N.		On way home from India.. ..	—
Lucas, T. C., M.B. ..	Bombay	Surg. to H.E. the Governor of Bombay.	2.
Lunn, W. E. C., M.B. ..	Lahore		—
Luxmoore, E. J. H. ..	Dover		—
Lynch, J. P.	Lydd	Officer in charge Military Hospital	—
McCammon, F.A., M.B.	Quetta		—
McCarthy, D. T., M.B. ..	Agra		—
McConaghy, W., M.B. ..	Tidworth		—
McDonnell, E., M.B. ..	Bermuda		—
MacDowell, W. MacD. ..	R.A.M. College		—
McEntire, J. T., M.B. ..	West Africa		—
McEwen, O. R.	Multan		-
McGrigor, D B., M.B. ..	Karachi		—
Mackenzie, D. F., M.B...	Dinapore		9.
McKenzie, J., M.B. ..	London	Recruiting duties	
MacKenzie, T. C., D.S.O.	Egypt	Egyptian Army	—
MacLaughlin, A. M., M.B.	Edinburgh	Sanitary Offi. Scottish Command	1.
McLennan, F., M.B. ..	Aberdeen	Officer in charge Military Hospital	—
McMunn, A.	Dublin		—
MacNicol, R. H., M.B. ..	R.A.M. College		—
Marett, P. J.	Malta		—
Martin, J. F., M.B. ..	Sandhurst	Assistant Surgeon R. Mil. College	2.
Matthews, J.	Karachi	Spec. in Ophthalmology, Staff Surg.	7.
Maughan, J. St. A. ..	Cosham		—
Maydon, W. G.	Scottish Command ..		—
Meaden, A. A.	Nasirabad	Officer in ch. Cantonment Hosp.	—
Meadows, S. M. W. ..	R.A.M. College		—
Meldon, J. B., M.B. ..	,, ,, ...		—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Meredith, R. G., M.B. ..		On way home from Malta ..	—
Middleton, E. M. ..	Rawal Pindi		—
Millar, C. R.	W. Africa	Officer in charge Military Hospital, Wilberforce	—
Mitchell, A. H. McN. ..	Netley	Specialist in Ophthalmology ..	7.
Mitchell, W., M.B. ..	Ambala		—
Moore, E. H. M.	Newport	Officer in charge Military Hospital	—
Moriarty, T. B.	Lucknow	Officer in charge X-rays Apparatus, Specialist in Electrical Science, 8th Division	—
Morris, C. R. M., M.B. ..	Sialkot		—
Morton, H. M., M.B. ..	Pretoria		—
Moss, E. L.		On way home from India.. ..	—
Mulligan, J. B. G. ..	Malta		—
Murphy, J. P. J., M.B. ..	Dover		2.
Myles, C. D., M.B. ..	Gosport		2.
Nealor, W. S.		On way home from India.. ..	—
Newman, R. E. U., M.B...	Rawal Pindi		—
Nicholls, H. M., M.B. ..	Colaba	Embarkation Medical Officer, Bombay, Specialist in Ophthalmology	—
Nimmo, W. C.	Chakrata		—
Noke, F. H., M.B. ..	Aldershot	Company Officer No. 2 Company	—
Norman, H. H.	Shwebo		—
O'Brien, C. W.		On way home from India.. ..	—
O'Brien-Butler, C. P. ..	Purandhur	Officer in charge Military Hospital	—
O'Carroll, A. D., M.B. ..	Ambala		—
O'Connor, R. D.	Kasauli	Officer in ch. Cant. Genl. Hosp.	—
Odlum, B. A.	Wynberg		—
O'Farrell, W. R.	Khartoum		—
O'Grady, D. De C. ..	Rawal Pindi	Spec. in Dermatology, 2nd Div.	—
O'Keefe, J. J., M.B. ..	Roorkee		—
Ommanney, F. M. M. ..	Colchester	Company Officer	—
O'Neill, F. M., M.B. ..	Nowgong		—
O'Reilly, P. S.	Wellington	Specialist in Ophthalmology ..	7.
Ormrod, G., M.B. ..	Ireland		—
Osburn, A. C.	Colchester		—
Otway, A. L., M.B. ..	Belfast		—
Paine, E. W. M.	Calicut	Officer in charge Military Hospital	—
Painton, G. R.		(West African Leave)	—
Pallant, S. L.	R.A.M. College		16.
Palmer, F. J.	Meerut	Specialist in Advanced Oper. Surg.	5
Parkes, E. E., M.B. ..	Plymouth	Specialist in Ophthalmology ..	7.
Parry, F. M., M.B. ..	Maidstone	Adjutant School of Instruction R.A.M.C. T.F.	—
Parsons, A. R. C... ..	Edinburgh..	Specialist in Advanced Oper. Surg.	5.
Pascoe, J. S.	Enniskillen	Officer in charge Military Hospital	—
Patch, B. G.	R.A.M. College		—
Pennefather, E. M. ..	,, ,, ...		—
Perry, H M. J.	Hong Kong		—
Petit, G.	Meerut		—
Phelan, E. C., M.B. ..	Lebong		—
Phillips, T. McC., M.B...	Lucknow		—
Pinches, H. G.	Straits Settlements ..	Officer in charge Military Hospital, Blakan Mati	—
Popham, R. L.	Cork		—
Potter, T. J.	Jamaica	Special duty under Colonial Office	2.3.
Potts, E. T., M.D. ..	Pretoria	Officer in charge Mil. Fam. Hosp.	—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medidine.
10. Sklagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Powell, E. W.	Aden	In charge Brigade Laboratory, and Spec. in Prevention of Disease	8.
Powell, J., M.B.	Egypt	Egyptian Army	—
Powell, J. E.		(Sick Leave)	—
Power, P., M.B.	Kilkenny	Officer in charge Military Hospital	4.
Power, W. M.	Jamaica		8.
Prescott, J. J. W., D.S.O.	Newcastle	Adjutant School of Instruction R.A.M.C. T.F.	7.
Priestley, H. E.	Gibraltar	Anæsthetist	—
Purdon, W. B., M.B. ..	Wellington		—
Purser, L. M., M.B. ..	Sialkot	Specialist in Otology, Laryngology and Rhinology	13.14.
Rahilly, J. M. B., M.B.		On way home from Egypt ..	—
Ranking, R. M., M.B. ..	Cork	Specialist in Advanced Oper. Surg.	5.
Reed, G. A. K. H. ..	Aldershot	Specialist in Physical Training ..	6.
Rees, G. H., M.B. ..	Alexandria		—
Renshaw, J. A.	Bangalore		—
Riach, W., M.D.	London	Specialist in Ophthalmology Q.A. Military Hospital	2.7.
Richard, G. H.	Londonderry		—
Richards, F. G.	Jamaica	Officer in charge Military Hospital Port Royal	—
Richmond, J. D., M.B. ..	R.A.M. College		—
Ritchie, M. B. H., M.B.	Rawal Pindi	Offg. S.O., M.M.S., 2nd (Rawal Pindi) Division	—
Ritchie, T. F., M.B. ..	W. Africa	Officer in charge Military Hospital, Mount Auriol	—
Roberts, F. E.		On way home from Malta ..	—
Robinson, J. H.	Curragh	Officer in charge Mil. Fam. Hosp.	8.
Robinson, T. T. H., M.B	Neemuch	Officer in ch. Cantonment Hosp.	—
Roch, H. S.	Leeds	Adjutant School of Instruction R.A.M.C.T.F.	3.
Rogers, H., M.B.	Queenstown		—
Ronayne, C. R. L., M.B.	Gibraltar	Specialist in Ophthalmology ..	7.
Rose, A. M., M.B. ..	R.A.M. College		2.
Rowan-Robinson, F. E., M.B.	Colchester		—
Rudkin, G. F.	Madras	Staff Surgeon, Fort St. George, and in medical charge H. E. the Governor's Body Guard	—
Rugg, G. F.	Quetta	Specialist in Advanced Oper. Surg.	5.
Russell, H. W., M.D. ..	Aldershot	Clin. Pathologist, Cambridge Hosp.	3.
Rutherford, R., M.B. ..	Straits Settlements ..		—
Ryan, E.	Aldershot	Duty with Families, Specialist in Midwifery	8.
Ryley, C.	Shoeburyness		2.
Safford, A. H.	Fyzabad	In charge Brig. Laboratory, Spec. in prevention of diseases	2.8.
Sampey, A. W.	Warley		2.9.
Sampson, F. C., M.B. ..	Potchefstroom		—
Sampson, P.	Rawal Pindi		—
Scaife, C., M.D.	Colaba	Officer in ch. Brigade Laboratory, Spec. in Prevention of Disease	2.
Scatchard, T.	Ranikhet	Staff Surgeon and in charge Cantonment Hospital	—
Scott, J. W. L.	Quetta	Staff Surgeon	—
Scott, T. H., M.B. ..	Ferozepore		—

Special Qualifications.

1. State Medicine
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Seccombe, J. W. S. ..	Jhansi		2.
Seeds, A. A., M.D. ..	Hounslow	In charge Kneller Hall	—
Sewell, E. P., M.B. ..	Belfast	Sanitary Officer Belfast District..	1.2.
Sexton, T. W. O... ..	Pretoria		—
Shea, H. F., M.B. ..	Ambala		—
Sheehan, G. F.	Barrackpore		11.
Sherren, H. G.	Belgaum		—
Siberry, E. W.	Pretoria	Company Officer	—
Sidgwick, H. C., M.B. ..	Jamaica		—
Sim, J. A. B., M.B. ..	Bermuda		—
Simson, H.	Poona	Spec. in Prevention of Disease ..	1.
Sinclair, M., M.B. ..	Cork		—
Skelton, D. S.	R.A.M. College		2.
Skinner, R. McK. ..	Straits Settlements ..	Officer in charge Military Hospital, Fort Canning	8.
Smales, W. C.	Poona	Officer in charge Cantonment Hosp.,Spec. in Electrical Science	—
Smallman, A. B., M.B. ..	Colchester		2.
Smith, C. S., M.B. ..	Mullingar	Officer in charge Military Hospital	—
Smith, S. B., M.D. ..	Dublin		2.
Smyth, R. S., M.D. ..	Ambala		—
Sparkes, W. M. B. ..	Dublin		13.14.
Spencer, J. H., M.B. ..	Ambala		—
Spiller, W. M. H., M.B...	Liverpool	Adjutant School of Instruction, R.A.M.C. T.F.	2.3.
Spong, W. A., M.B. ..	Quetta		—
Stack, H. T., M.B. ..	R.A.M. College		—
Stanley, C. V. B., M.D. ..	Egypt	Civil Public Health Department..	—
Steele, W. L.	Tidworth	Spec. in Advanced Opera. Surgery	5.
Stephens, F. A.	Birmingham	Adjutant School of Instruction, R.A.M.C. T.F.	—
Stevenson, G. H , M.B...	Ambala		—
Stewart, H., M.B. ..	Ferozopore		—
Stewart, P. S., M.B. ..	Malta		—
Storrs, R.	Portsmouth	Officer in charge Mil. Fam. Hosp.	8.
Straton, C. H.	London	Sanitary Officer Area South of Thames and London District	1.2.
Stuart, F. J., M.B. ..	Meerut		..
Sutcliff, A. A., M.B. ..	Alderney	Officer in charge Military Hospital	—
Sylvester-Bradley, C. R.	R.A.M. College		—
Symons, V. H.	Bloemfontein		—
Tabuteau, G. G.	Jhansi	Staff-Surgeon	—
Tate, R. G. H., M.D. ..	Ambala	In charge Brigade Laboratory ..	2.
Thompson, R. J. C. ..	Egypt	Egyptian Army	—
Thompson, W. I., M.B...	Lucknow		—
Thomson, C. G.		On way home from India.. ..	—
Thomson, C. P., M.D. ..	Egypt	Civil Public Health Department	—
Thomson, D. S. B., M.B.	Egypt	Egyptian Army	—
Thorpe, L. L. G... ..	Netley		—
Thurston, L. V.	Cork District		—
Tobin, J.	Devonport	Officer in charge Mil. Fam. Hosp.	8.
Todd, R. E., M.B. ..	Cairo		—
Treves, H. T.	London		—
Turnbull, J. A.	Ayr	Officer in charge Military Hospital	—
Turner, C. H.	Newbridge	,, ,, ,, ,,	—
Turner, F. J.	R.A.M. College		—
Turner, F. T.	Poona		—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Tyndale, W. F., C.M.G., M.B.	Dublin		1.2.
Unwin, T. B., M.B. ..	West Africa		—
Vaughan, W. F. H. ..	Cosham		—
Vidal, A. C.	Bloemfontein		—
Walker, F. S., F.R.C.S.I.	Queenstown	Officer in charge Haulbowline ..	—
Walker, N. D., M.D. ..	R.A.M. College		2.6.
Wallace, G. S., M.B. ..	Aldershot		2.
Ware, G. W. W., M.B. ..	Aden	Officer in charge Section Hospital, Crater	—
Waring, A. D., M.B. ..	Hong Kong	Company Officer	—
Waters, W. J.	Crown Hill		—
Watson, D. P., M.B. ..	Lancaster	Officer in charge Military Hospital	—
Webster, J. A. W. ..	R.A.M. College		—
West, J. W., M.B. ..	Rawal Pindi	Spec. in Advanced Oper. Surgery	2.5.
Weston, A. F.	Netley	Pathologist	—
Weston, W. J.	Gibraltar		3.
Wetherell, M. C., M.D. ..	Ireland		—
Whelan, J. F., M.B. ..	India	(On voyage out)	2.
White, C. F., M.B. ..	Rangoon		—
White, R. K.	Aldershot		—
Whitehead, E. C., M.B. ..	R.A.M. College		—
Wiley, W., M.B.	R.A.M. College		—
Williams, A. S.	Dinapore		—
Williamson, A. J., M.B...	Woolwich	Spec. in Advanced Oper. Surgery	5.
Wilmot, R. C.	R.A.M. College		—
Wilson, H. T.	Southern Command ..		—
Wilson, M. O., M.B. ..	Ambala		—
Wilson, R. C., M.B. ..	Netley	Officer in charge Mil. Fam Hosp. and Specialist in Otology	13.14.
Winckworth, H. C. ..	R.A.M. College		16.
Winder, J. H. R., M.D. ..	Shorncliffe		—
Winder, M. G.	Dover		—
Wingate, B. F.	Secunderabad		—
Winslow, L. F. F. ..	Pontefract	Officer in charge Military Hospital	—
Wood, A. E. B., M.B. ..	R.A.M. College		—
Wood, J. L.	Naini Tal		—
Wood, L.	Manchester	Adjutant School of Instruction, R.A.M.C. T.F.	—
Woodley, R. N.	Bulford	Officer in charge Mil. Fam. Hosp.	—
Woodside, W. A.	Ipswich	Adjutant School of Instruction, R.A.M.C. T.F.	—
Worthington, E.S., M.V.O.	London		5.
Wright, T. J.	R.A.M. College		2.
Wyatt, C. J., M.B. ..	R.A.M. College		—

LIEUTENANTS.

Archer, T. C. R.		(On probation)	—
Beckton, J. J. H... ..	India		—
Benson, C. T. V.	Aldershot		—
Bovis, A. W.	Chatham		—
Biggar, B., M.B.		(On probation)	—
Bissett, W., M.B. ..		(„ „)	—
Blake, H. H., M.B. ..	Allahabad		—
Bowie, J. D., M.B. ..	Aldershot		—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Bradley, F. H., M.B.	Calcutta		—
Brett, P. M. J., M.B.		(On probation)	—
Bridges, R. F., M.B.	Shorncliffe		—
Buist, D. S., M.B.	India		—
Burney, W. H. S.	Egypt	Egyptian Army	—
Byrne, A. W., M.B.	Lahore		—
Cane, A. S.	London	Officer in charge St. John's Wood	—
Cane, E. G. S.		(On probation)	—
Chambers, G. O.	York		—
Clark, J. A., M.B.	Egypt		—
Clarke, C., M.B., F.R.C.S.	Malta		—
Collett, G. G., M.B.	Quetta		—
Comyn, K.	Woolwich		—
Cunningham, F.W.M., M.D.	Curragh		—
Dalgleish, F. B.	Indore	Officer in charge Section Hospital	—
Davies, R. M., M.B.	Chatham		—
Davis, A. H.T.	Secunderabad		—
Dickson, R. M., M.B.	Lucknow		—
Dickson, T. H., M.B.	Dublin	Anæsthetist	—
Dive, G. H.	London		—
Dunn, W. J., M.B.	Kirkee		—
Dykes, S. S., M.B.	Glencorse		—
Edwards, H. R.	Woolwich		
Ellcome, J. E.	Kamptee		—
Elvery, P. G. M.	Curragh	Under orders for Egypt	—
Eves, T. S., M.B.	Lucknow		—
Field, P. C.	Aldershot		—
Finny, C. M., M.B.		(On probation)	—
Foster, A. L.	Rawal Pindi		—
Franklin, C. L., M.B.	Preston		—
Fraser, A. E. G.	Cairo		—
Fretz, W. L. E., M.B.		(On probation)	—
Frost, W. A., M.B.		(„ „)	—
Fyffe, E. L., M.B.	Cork	Company Officer	—
Gale, R., M.B.	London	Recruiting duties	—
Galgey, R. C.			—
Gall, H.	Jullundur		—
Gaunt, E. T., M.B.	Shorncliffe	Officer in charge Laboratory	—
Gaunt, J. K., M.B.	Fermoy		—
Gilmour, J., M.B., F.R.C.S.Edin.	Devonport		—
Graham, W. I., M.B.		(On probation)	—
Hallinan, T. J., M.B.	Fermoy		—
Harding, C. E. L., M.B.	Purandhur	Officer in charge Military Hospital	—
Harold, C. H. H., M.D.	London		—
Hayes, L. C., M.B.	London		—
Hayes, P., M.B.		(On probation)	—
Hewson, F. M.	Karachi		—
Hill, J. R., M.B.	Manchester	Officer in charge Military Hospital	—
Houston, J. W., M.B.	Belgaum	In charge Brig. Laboratory, Spec. in Prevention of Disease	—
Hutchinson, V. P.	Southern Command		—
James, J., M.B.	Potchefstroom		—
Jones, A. G., M.B.	Tidworth		—
Jones, J. B., M.B.	Muttra		—
Joynt, H. F., M.B.	Hounslow		—
Keane, G. J., M.D.	Uganda	(Seconded under Colonial Office)	2.9.

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Advanced Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Kidd, J. D., M.B.		(On probation)	—
Kinkead, R. C. G. M., M.B.	Cork		—
Kyle, S. W., M.B.	India		—
Laing, F. R., M.B.	Bordon		—
Lambkin, E. C., M.B.	Caterham		—
Lane, J. W., M.D.	India		—
Leckie, M.	Egypt	Egyptian Army	—
Leeson, H. H.	Cairo		—
Levack, J. S., M.B.		(On probation)	—
MacArthur, D. H. C., M.B.	Ambala		—
MacArthur, W. P., M.B.	Aldershot		2.
McCombe, J. S., M.B.	Malappuram	Officer in charge Military Hosp.	—
McCreery, A. T. J., M.B.	India		—
McNeill, A. N. R., M.B.	Mauritius	Offi. in ch. Mty. Hosp. Port Louis	—
McQueen, C.	Pretoria		—
McSheehy, O. W., M.B.	Devonport		—
Manifold, J. A., M.B.	Glasgow	Recruiting duties	—
Marshall, W. E., M.B.	Egypt	Egyptian Army	—
Mathieson, W.	Potchefstroom		—
Mitchell, T. J., M.B.	Lahore		—
Monteith, H. G.		(On probation)	—
Murphy, L.	Secunderabad		—
Nicholls, T. B., M.B.	Cairo		—
Nicol, C. M., M.B.	Ipswich	Officer in charge Military Hospital	—
Nolan, R. H.	India		—
O'Connor, A. P., M.B.	Brighton	Officer in charge Military Hospital	—
O'Kelly, R.	Bangalore		—
O'Riordan, W. H.	Lichfield		—
O'Rorke, C. H., M.B.	India		—
Paris, R. C.	Netley		—
Parkinson, G. S.	Harrismith		—
Parsons-Smith, E. M.	London		—
Pollard, A. M.	Bloemfontein		—
Pottinger, D. E. C., M.B.	India		—
Priest, R. C., M.B.	Colchester		—
Ranken, H. S., M.B.	London		—
Rennie, W. B., M.B.	India	(On voyage out)	—
Reynolds, D., M.B.		(On probation)	—
Rigby, C. M.	Jubbulpore		—
Robb, C., M.B.	Curragh		—
Robertson, H. G., M.B.	Lichfield		—
Robinson, F. A., M.B.		(On probation)	—
Roche, J. J. D., M.B.	Belfast	Anæsthetist	—
Ryles, C., M.B.	Karachi	In charge Brigade Laboratory	—
Saunders, S. McK.	Cairo		—
Seaver, C. D. K.		(On probation)	—
Shepherd, A., M.B.	Agra		—
Sherlock, C. G., M.D.	India		—
Simson, J. T., M.B.	Aldershot		—
Somers-Gardner, F. H., M.B.	Cosham		—
Stack, G. H., M.B.	W. Africa		—
Stallybrass, T. W., M.B.	Netley		—
Stanley, H. V., M.B.	Dublin		—
Startin, J.	Poona		—
Steven, W. S. R., M.B.		(On probation)	—
Stevenson, A. L., M.B.	Bangalore		—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
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6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Stirling, A. D., M.B. ..	Glencorse	Officer in charge Military Hospital	—
Stoney, E. C., M.B. ..	Colchester	Anæsthetist	—
Stringer, C. H.	Netley		—
Suhr, A. C. H., M.B. ..	Malta		2.
Taylor, G. P., M.B. ..	Glasgow		—
Tobin, W. J.	Secunderabad		—
Tomlinson, P. S. ..	Tidworth		—
Treves, W. W., M.B. F.R.C.S.	Chatham		—
Varvill, B.	Quetta		—
Vaughan, E. V., M.B. ..	Straits Settlements ..		—
Walker, S. G., M.B. ..	Cawnpore		—
Way, L. F. K. ..	Cosham		—
Weddell, J. M.	London		—
Wells, A. G.	Lahore		—
Weston, T. A., M.B. ..		(On probation)	—
White, M., M.B.	Bordon		—
Williamson, M. J., M.B...	Cardiff		—
Wilson, G., M.B. ...		(On probation)	—
Winder, A. S. M., M.B...	Curragh	Anæsthetist	—
Worthington, F., M.B. ..	Ceylon		—
Wright, A. R., M.B. ..	Malta		—
Wright, W. G.. M.B. ..	Netley		—
Yourell, J. R., M.B. ..	Belfast		—

QUARTERMASTERS.

Honorary Majors.

Name.	Station.
Beach, J. H. W.	London.
Brake, T. F.	Curragh.
Bruce, A.	Woolwich.
Hasell, H. G.	—
Merritt, G...	Cape Town.
Short, J. B.	London.

Honorary Captains.

Attwood, J.	Tientsin.
Audus, H. J. F.	Tidworth.
Brooks, H. S.	Edinburgh
Chalk, A. J.	Cairo.
Conolly, J. B.	Wynberg.
Cowan, R. R.	Aldershot.
Crookes, F.	Dublin.
Essex, B. E.	Cairo.
Exton, T.	Tidworth.
Glover, H. W.	Chester.
Green, J.	Malta.
Hall, F. W.	South Africa.
Houghton, E.	Pretoria.
Lunney, A.	Cosham.
McClay, J...	York.
Offord, E. P.	Gibraltar.
Scott, R.	Netley.
Short, G. F.	Dublin.
Spackman, H.	Chatham.
Talbot, W. J. C.	Woolwich.
Wakefield, H. P.	Southampton.
Wheeler, A.	Shorncliffe.
Wilson, A...	Devonport.
Woolley, H.	Dover.

Honorary Lieutenants.

Name.	Station.
Archibald, W. N.	Colchester.
Clapshaw, A.	Bloemfontein.
Clark, J.	Woolwich.
Cope, T. F.	Pretoria.
Gillman, J.	Depôt, Aldershot.
Kinsella, C. W.	Devonport.
Newland, E. W.	Netley.
Osborne, J. W.	Netley.
Saunders, E. V.	Hong Kong.
Tait, A. F.	Aldershot.
Watkins, J.	Aldershot.
Wilson, J.	War Office.

MEDICAL OFFICERS OF THE HOUSEHOLD CAVALRY.

Rank.	Name.	Regiment.
Surg.-Lieutenant-Colonel	Deeble, B. W. C.	1st Life Guards.
Surgeon-Major	Pares, B.	Royal Horse Guards.
,, ,,	Power, J. H.	2nd Life Guards.
Surgeon-Captain	Bodington, P. J., M.B.	Royal Horse Guards.
,, ,,	Cowie, R. M.	2nd Life Guards.
,, ,,	Hayes, G. S. C.	1st Life Guards.

MEDICAL OFFICERS OF THE BRIGADE OF GUARDS.

Rank.	Name.	Regiment.
Surg.-Lieutenant-Colonel	Bateson, J. F., M.B.	Coldstream Guards.
,, ,, ,,	Crooke-Lawless, Sir W. R., Knt., C.I.E., M.D.	,, ,,

RETIRED MEDICAL OFFICERS OF THE REGULAR ARMY WHO ARE EMPLOYED

Name.	Station where Employed.
Allport, Major C. W., M.D.	Great Yarmouth.
Archer, Lieut.-Colonel T., M.D.	Lydd.
Baird, Lieut.-Colonel A., M.B., F.R.C.S.Edin.	Worcester.
Barnes, Lieut.-Colonel R. W.	Dorchester.
Battersby, Lieut.-Colonel H. L.	Bodmin.
Bourke, Lieut.-Colonel U. J., M.B.	Hamilton.
Browne, Colonel A. L., M.D.	Taunton.
Browne, Lieut.-Colonel A. W.	Armagh.
Burke, Major J. F.	Falmouth.
Butterworth, Major S.	Carlisle.
Charlesworth, Lieut.-Colonel H., C.M.G.	Nottingham.
Clements, Lieut.-Colonel W. G.	Christchurch.
Coutts, Lieut.-Colonel G., M.B.	Chichester.
Davoren, Major V. H. W.	Bury St. Edmund's.
Day, Lieut.-Colonel W. B.	Staff Officer to A.M.O. 2nd London Division Territorial Force, London.
Dillon, Major H. V.	Scarborough.
Dowman, Lieut.-Colonel W. S.	Northampton.
Duggan, Major C. W., M.B.	Lincoln.
Duncan, Lieut.-Colonel S. E.	Shrewsbury.
Finlay, Lieut.-Colonel W.	Jersey.
Freeman, Major E. C., M.D.	Staff Officer to A.M.O., East Anglian Division Territorial Force, Ipswich.
Gormley, Lieut.-Colonel J. A., M.D.	Kingston.
Greig, Lieut.-Colonel F. J.	Stirling.

Name.	Station where Employed.
Haywood, Lieut.-Colonel L., M.B.	Staff Officer to A.M.O. South Midland Div. Territorial Force, Birmingham.
Hodson, Lieut.-Colonel R. D.	Trowbridge.
Hosie, Lieut.-Colonel A., M.D.	Sandown.
Irvine, Lieut.-Colonel D. L.	Staff Officer to A.M.O. North Midland Division Territorial Force, Derby.
Jackson, Major R. W. H., M.B.	Lichfield.
James, Lieut.-Colonel H. E. R., F.R.C.S.	War Office.
Kay, Lieut.-Colonel A. G., M.B.	Clifton, Bristol.
Kearney, Lieut.-Colonel J., M.D.	Wrexham.
Keays, Lieut.-Colonel W., F.R.C.S.I.	Weymouth.
McCormack, Major R. J., M.D.	Omagh.
McCreery, Lieut.-Colonel B. T., M.B., F.R.C.S.I. ..	Perth.
Moir, Major J. D., M.B.	Fort Efford and Mutley District.
Mosse, Lieut.-Colonel C. G. D., F.R.C.S.I.	Guernsey.
Myles, Major E. H., M.B.	Guernsey.
Nicolls, Lieut.-Colonel J. M., M.B.	Detention Barracks, Cork.
Osburne, Lieut.-Colonel J.	Galway.
Parker, Colonel W. A.	Penally.
Peeke, Major H. S.	Derby.
Power, Major R. I.	Waterford.
Poynder, Lieut.-Colonel G. F.	Bedford.
Reckitt, Lieut.-Colonel J. D. T.	Staff Officer to A.M.O. 1st London Division Territorial Force, London.
Riordan, Lieut.-Colonel J., M.B.	Clonmel.
Robinson, Surgeon-Lieut.-Colonel G. S.	Eastbourne.
Rowney, Lieut.-Colonel W., M.D.	Manchester.
Scanlan, Lieut.-Colonel A. De C...	Guildford.
Scott, Lieut.-Colonel H., M.B.	Landguard Fort.
Spence, Major A. E. C., M.B.	Warwick.
Stokes, Lieut.-Colonel H. H., M.D.	Oxford.
Trewman, Lieut.-Colonel G. T.	Reading.
Trotter, Major W. J.	Naas.
Tuckey, Lieut.-Colonel T. B. A.	Detention Barracks, York.
Wade, Major G. A., M.D., F.R.C.S.I.	Horfield.
Webb, Colonel C. A...	Staff Officer to A.M.O. Wessex Division Territorial Force, Exeter.
Whitty, Lieut.-Colonel M. J., M.D.	Liverpool.
Wight, Lieut.-Colonel E. O.	Staff Officer to A.M.O. Home Counties Division Territorial Force, Hounslow.
Williamson, Lieut.-Colonel J. G.	Leicester.
Wilson, Lieut.-Colonel E. M., C.B., C.M.G., D.S.O. ..	Record Office, Aldershot.
Woods, Lieut.-Colonel C. R., M.D.	Birr.
Wright, Major A.	Falmouth.
Zimmermann, Major B. F...	Topsham.

JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS.

Corps News.

JANUARY, 1911.

ROYAL ARMY MEDICAL CORPS.

The King has been pleased to give and grant unto Captain Howard Ensor, D.S.O., Royal Army Medical Corps, His Majesty's Royal licence and authority to accept and wear the Imperial Ottoman Order of the Osmanieh, Fourth Class, which has been conferred upon him by His Highness the Khedive of Egypt, authorised by His Imperial Majesty the Sultan of Turkey, in recognition of valuable services rendered by him.

REGULAR FORCES.

ESTABLISHMENTS.

Royal Army Medical Corps School of Instruction.—Major Claude K. Morgan, M.B. R.A.M.C., to be an Instructor, *vice* Major C. C. Fleming, D.S.O., who has vacated that appointment. Dated October 29, 1910

CAVALRY.

1st Life Guards.—Surgeon-Captain Alfred C. Lupton, M.B., is placed temporarily on the half-pay list on account of ill-health. Dated November, 22, 1910.

ARMY MEDICAL SERVICE.

Royal Army Medical Corps.—The undermentioned officers, from the seconded list, are restored to the Establishment, dated November 18, 1910:—Captain William M. B. Sparkes. Lieutenant Harold T. Treves.

Captain Edward Gibbon, M.B., is seconded for service with the Egyptian Army. Dated November 13, 1910.

ARRIVALS HOME FOR DUTY.—From India: On November 24, Lieutenant-Colonel T. B. Winter; Captains C. H. Turner, J. P. Lynch, and E. G. R. Lithgow. From Straits Settlements: On November 29, Major I. A. O. MacCarthy, Captain A. A. Sutcliff. From Hong Kong: On November 29, Majors S. Macdonald and P. J. Probyn, D.S.O. From Mauritius: On December 8, Major John H. Campbell, D.S.O. From South Africa: On December 8, Lieutenant-Colonel J. Maher. From North China: On November 29, Captain E. J. Elliot. Quartermaster and Hon. Captain G. A. Benson, arrived home from North China on November 29, 1910.

POSTINGS.—Captain E. J. Elliot and Lieutenant G. O. Chambers to the Northern Command; Lieutenant J. D. Bowie to the Aldershot Command; Major I. A. O. MacCarthy, Captains J. P. Lynch and E. G. R. Lithgow, Lieutenants W. W. Treves and R. F. Bridges to the Eastern Command; Captain W. F. H. Vaughan (from sick leave), Lieutenants C. H. Stringer and L. F. K. Way to the Southern Command; Captain C. H. Turner, Lieutenants J. K. Gaunt, E. L. Fyffe and T. J. Hallinan to the Irish Command; Lieutenant-Colonels T. B. Winter and J. Maher, Majors S. Macdonald and John H. Campbell, D.S.O., Lieutenant C. K. H. Harold to the London District; Captain A. A. Sutcliff to Alderney.

TRANSFERS.—Colonel W. G Macpherson, C.M.G., from Malta to India; Lieutenant-Colonel E. J. E. Risk from the Irish Command to the London District; Lieutenant-Colonel R. R. H. Moore from the Southern Command to the Irish Command; Lieutenant-Colonel H. P. G. Elkington from the Irish Command to the Southern Command; Major F. J. W. Porter, D.S.O., from the London District to the Southern Command; Major G. H. Goddard from Alderney to the Eastern Command.

APPOINTMENTS.—Lieutenant-Colonel W. G. Birrell, charge of the Royal Herbert Hospital, Woolwich. Lieutenant-Colonel R. R. H. Moore, Administrative Medical Officer, Belfast District. Lieutenant-Colonel T. B. Winter, Senior Recruiting Medical Officer, London District. Lieutenant-Colonel J. Maher, charge of the Queen Alexandra Military Hospital, London. Majors S. Macdonald and J. H. Campbell, D.S.O., Recruiting Medical Officers, London District. Major W. W. O. Beveridge, D.S.O., Specialist in Sanitation, London District, for duty in connection with food inspection and analysis. Major G. H. Goddard, charge of Milltary Families Hospital, Shorncliffe.

QUALIFICATION.—Captain P Dwyer has obtained the Diploma in Public Health (Honours) of the Royal Colleges of Physicians and Surgeons in Ireland, 1906.

ARRIVALS HOME ON LEAVE.—Major L. P. More, Captains P. J. Marett, A. Dawson, and T. W. O. Sexton.

EMBARKATIONS.

For India.—On November 19, Lieutenant-Colonel C. T. Blackwell, Major H G. F. Stallard, Captains J. G. Foster, W. R. P. Goodwin, and H. E. J. A. Howley. On December 7, Lieutenant-Colonel F. W. C. Jones, Major W. B. Winkfield, Captains C. H. Furnivall and G. F. Rugg.

For Gibraltar.—On October 14, Lieutenant-Colonel S. G. Allen (by exchange with Lieutenant-Colonel C. W. Johnson).

For Bermuda.—On November 25, Lieutenant-Colonel R. H. Hall.

ROSTER FOR SERVICE ABROAD.

An exchange of positions on the roster has been approved between Lieutenant-Colonel W. Turner and Major A. H. O. Young.

RESULTS OF EXAMINATIONS.

The following results of examinations are notified for general information:—

Passed for promotion to the rank of Captain in (*b*): B. Varvill; D. B. McGrigor, M.B.; J. J. D. Roche, M.B; P. G. M. Elvery; M. J. Williamson, M.B.; F. Worthington, M.B.

SERVICE ABROAD.

In forwarding the roster for service abroad which is printed below the following has been communicated by the Director-General:—

(1) As it is probable that the Establishment of Lieutenant-Colonels will be reached during 1911, a separate roster of all lieutenant-colonels without distinction as to rate of pay has been established. This roster will come into force as from March 1, 1911.

(2) Exchanges on the roster will in future be permitted between officers of the same rank only.

(3) As laid down in Paragraph 5 of the Regulations for the Army Medical Service, those officers who have been longest at home will, as a general rule, be the first to proceed abroad; but it may be necessary to select officers to fill important appointments abroad irrespective of their actual position on the roster.

(4) The distribution list of lieutenant-colonels published in the Journal of January, 1910, is cancelled.

(5) The names of officers holding appointments for fixed periods are printed in italics with date of expiration of the same, except in the case of appointments which expire during the trooping season 1911-12, which are shown in ordinary type.

(6) Officers holding gazetted appointments the dates of which are shown in the Army List (except those whose appointments terminate during the trooping season 1911-12) are omitted, as well as those who retire in 1911.

LIEUTENANT-COLONELS.

Kirkpatrick, R., C.M.G. (1.9.11), Mil. Hosp., Devonport.
Hanley, R. G.
Johnson, C. W.
O'Connell, D. V. (23.4.12), Mil. Hosp., Shorncliffe.
Macdonald, C. J.
Reilly, C. C. (8.12.11), R. M. Coll., Sandhurst.
Russell, M. W. (22.8.13), Staff Offi. P.M.O. Eastern Com.
Heuston, F. S. (11.11.11), Mil. Hosp., Edinburgh.
Tyrrell, C. R.
Sloggett, H. M. (28.10.11), Connaught Hosp., Aldershot.
Dodd, A.
Burton, F. H. M. (18.4.13), Mil. Hosp., Colchester.
Russell, J. J. (1.11.14), S.O., P.M.O. Southern Com.
Fallon, J.
Newland, F. R. (6.12.12), S.O., P.M.O. Northern Com.
Saunders, D. M.
Johnston, H. H., C.B. (14.4.12), Mil. Hosp., Curragh.
Lane, C. A.
Hearn, M. L. (20.1.12), M.I. Recruits, Irish Com.
Sexton, M. J.
Ferguson, N. C.
Donaldson, J.
Lavie, T. G.
Rhodes, J. H. A.
Wilson, J. B. (18.2.12), Surg. Div., R. Herbert Hosp.
Daly, J. H.
Donnet, J. J. C.
Will, J.
Treherne, F. H. (15.3.12), Camb. Hosp., Aldershot.
Noding, T. E.
Holyoake, R.
Kennedy, A. (14.1.13), D. Block, Netley.
Yarr, M. T. (1.3.13), M.I. Recruits, Scotland.
Whaite, T. du B. (15.3.13), Royal Arsenal, Woolwich.
Donegan, J. F.
Moore, R. R. H.
Adamson, H. M. (9.12.12), Mil. Hosp., Newcastle.
Simpson, R. J. S. (1.2.13.), Med. Div., R. Herbert Hosp.
Birt, C. (1.10.13), Royal Infirmary, Dublin.
Gerrard, J. J. (24.11.12), M. I. Recruits, Northern Com.
Le Quesne, F. S., V.C.
Jencken, F. J. (1.12.12), R. V. H., Netley.
Haines, H. A.
O'Callaghan, D. M. (1.4.13), Surgical Wards, Cambridge Hosp., Aldershot.
Nichols, F. P.
Turner, W.
Rowan, H. D.
Wilson, G. (5.3.13), Mil. Hosp., Dover.
Elkington, H. P. G.
Cocks, H
Swan, W. T. (1.4.13), Med. Div., R. V. H., Netley.
Gordon-Hall, F. W. G.
Risk, E. J. E.
Gordon, P. C. H. (12.10.13), Mil. Hosp., Pem. Dock.
Pike, W. W. (14.4.13), Mil. Hosp., Tidworth.
Gubbin, G. F.
Birrell, W. G.
Cree, G. (30.1.14), M. I. Recruits, Eastern Com.
Berryman, W. E.
Winter, T. B. (29.1.14) S.M.O. Rectg., London.
Maher, J. (10.12.13), Q. A. Hosp., London.

MAJORS.

Sloan, J. M., D.S.O. (31.10.11), Adjt. Terr. Force.
Lloyd, R. H. (3.6.11), Adjt. Terr. Force.
McLoughlin, G. S., D.S.O. (1.9.11), M.I. Recruits, Western Com.
Wanhill, C. F. (29.7.11), Asst. Prof. R.A.M. Coll.
Brodribb, E. (15.8.12), Hythe.
McCarthy, J. McD.
Healy, C. J.
O'Flaherty, A. R.
Martin, C. B.
Cowan, J.
Mawhinny, R. J. W.
Goddard, G. H.
Green, S. F. St. D.
Fuhr, R. S. H., D.S. O. (13.8.12), Fam. Hosp., Woolwich.
Way, L.
Hodgson, J. E.
Lewis, R. C.
Young, A. H. O.
Faichnie, F. G.
Mangin, F. M.
Staddon, H. E.
Gray, W. L.
Barnett, K. B.
Marder, N.

Tate, G. W.
Lawson, D.
Ross, N. H. (29.8.11), Co. Offi. Depot.
Horrocks, W. H. (17.9.11), Advis. Board.
Dansey-Browning, G. (6.11.12), San. Offi., Aldershot.
Scott, A. L.
Powell, E. E.
O'Reilly, H. W. H.
Wroughton, A. O. B.
Addams-Williams, H. L.
Longhurst, B. W.
Bray, H. A.
Packer, H. D.
Tibbits, W.
Condon, E. H.
Lawson, C. B. (6.1.12), Surg. Divn., R.V.H. Netley.
Blenkinsop, A. P. (17.3.12), R.A.M. College.
Profeit, C. W.
Stanistreet, G. B.
Mitchell, L. A.
Taylor, W. J.
Tyacke, N.
Hooper, A. W., D.S.O.
Williams, E. McK.
Hayes, E. C. (11.10.12), San. Offi., Southern Com.
Jones, T. P. (18.8.12), Registrar, R. Herb. Hosp.
Moores, S. G. (2.4.14), S.O., P.M.O., Aldershot.
Mansfield, G. S.
Silver, J. P.
Beveridge, W. W. O., D.S.O.
Mould, W. T.
Clarke, T. H. M., C.M.G., D.S.O. (29.8.12), M.I. Rects., Southern Com.
Cummins, S. L.
Morgan, J. C. (29.1.13).
Fairrie, S. H.
Hardy, F. W. (4.12.12), San. Offi., Eastern Com.
Ferguson, J. D., D.S.O.
Moore, G. A. (1.1.13), Fam. Hos., Chatham.
Pearse, A.
Houghton, J. W. H.
Milner, A. E.
Spencer, C. G.
Begbie, F. W.
Bray, G. A. T.
O'Hallaran, M.
Ward, W. A.
Evans, P.
Master, A. E. (5.4.13), R. Arsenal. Woolwich.
Berryman, H. A.
Austin, J. H. E.
Burnside, E. A.
Clark, E. S.
Tyrrell, A. F.
Boyle, M.
Winter, H. E.
Hudleston, W. E.
Hewetson, H.
Carter, J. E.
Collingwood, P. H.
Erskine, W. D.
Read, H. W. K.
Inniss, B. J.
Collins, D. J.
Buist, J. M.
Dalton, C., (1.6.14), S.O., P.M.O, Irish Com.
Rattray, M. M.
Hall, S. O. (24.3.13) Fam. Hos., Fermoy.
Gibbard, T. W. (2.4.13), Lecturer in Syphilology, R.A.M. College.
Anderson, J. B. (10.11.13), Embarkation M.O., Southampton.
Grech, J.
Maurice, G. T. K.
Porter, F. J. W., D.S.O.
Killery, St. J. B.
Rawnsley, G. T.
Luther, A. J.
McDermott, T.
McMunn, R. J. (17.5.13), Registrar R. V. Hosp., Netley.
Howell, H. A. L. (31.10.13), R.A. Clothing Factory.
Prynne, H. V. (24.12.13), R. Mil. Acad.
Waring, A. H.
Heffernan, F. J. C.
Probyn, P. J., D.S.O.
Macdonald, S.
MacCarthy, I. A. O.
Campbell, J. H.

CAPTAINS.

Roch, H. S. (15.6.11), Adjt. Terr. Force.
Connolly, E. P. (15.6.11), Adjt. Terr. Force.
Woodside, W. A. (15.6.11), Adjt. Terr. Force.
Bennett, E. (15.6.11), Adjt. Terr. Force.
Stephens, F. A. (15.6.11), Adjt. Terr. Force.
Tobin, J. (1.12.11), Fam. Hosp. Devonport.
Prescott, J. J. W., D.S.O. (27.11.11), Adjt. Terr. Force.
Parry, F. M. (1.11.11), Adjt. Terr. Force.
Fleming, C. E.
Straton, C. H. (17.10.11), San. Offi., Eastern Com.
Sewell, E. P. (22.9.11), San. Offi., Irish Com.
Wood, L. (30.10.11), Adjt. Terr. Force.

LLoyd, L. N., D.S.O. (1.11.11), Adjt. Terr. Force.
Robinson, J. H. (30.9.11), Fam. Hosp., Curragh.
Cowey, R. V. (16.9.11), Fam. Hosp., Tidworth.
Evans, C. R.
Jameson, A. D.
Douglass, P. C.
Unwin, T. B. (9.9.12), Families, Aldershot.
Bostock, J. S.
Greenwood, A. R.
Hyde, P. G.
Seeds, A. A.
Murphy, J. P. J.
Bransbury, H. A.
Wilson, R. C.
Mitchell, A. H. McN.
Fitzgerald, F. G. (12.7.12), D. of Yorks School.
Woodley, R. N.
Biggam, T.
Fawcett, R. F. M.
Winslow, L. F. F.
Williamson, A. J.
Falkner, M. W.
Adye-Curran, W. J. P.
Crosthwait, W. S.
Ryan, E. (28.9.12), Families, Aldershot.
Rogers, H.
Harrison, L. W.
Foulds, M. F.
Cumming, C. C.
Sampey, A. W.
Winder, M. G.
Thorpe, L. L. G.
MacLennan, F.
Rowan Robinson, F. E.
Jones, J. L.
Fraser, A. N. (31.8.11), Adjt. Terr. Force.
Duguid, J. H.
Worthington, E. S.
Kiddle, H. H.
Harvey, F. (28.9.11), San. Offi., Southern Com.
Cotterill, L. (10.11.13), Co. Offi. Depot.
McMunn, A.
Winder, J. H. R.
Dorgan, J. (16.9.12), San. Offi., Irish Com.
Ritchie, T. F.
Harvey, W. J. S.
Waters, W. J.
Sparkes, W. M. B.
Popham, R. L.
Douglas, H. E. M., V.C., D.S.O.
Storrs, R. (6.10.13), Fam. Hosp., Portsmouth.
Conway, J. M. H.
Hyde, D. O.
Walker, F. S.
Kelly, W. D. C.
Bagshawe, H. V.
Franklin, R. J.
Clarke, F. A. H.
Parkes, E. E.
Ainsworth, R. B. (13.10.13), San. Offi., Southern Com.
Browne, W. W.
Hayes, A. H. (31.12.13), San. Offi., Northern Com.
Walker, N. D.
Smith, S. B.
Frost, A. T.
Ryley, C.
Ranking, R. M.
Curme, D. E.
Reed, G. A. K. H.
Carr, C. H.
Henderson, P. H.
Martin, J. F.
Easton, P. G. (1.8.13), Families, Aldershot.
Smith, C. S.
Davidson, H. A.
Balck, C. A. J. A.
Houghton, G. J.
Knox, E. B.
Power, P.
Russell, H. W.
Wallace, G. S.
Coates, T. S. (19.11.13), Royal Arsenal, Woolwich.
Crossley, H. J.
Harding, D. L.
McKenzie, J.
Steele, W. L.
Beatty, M. C.
Hayes, G. S. C.
Gurley, J. H.
Tyndale, W. F., C.M.G.
Stack, H. T.
Myles, C. D.
Bridges, R. H.
Bell, J. G.
Weston, A. F.
Lauder, F. P.
Langstaff, J. W.
Dudding, T. S.
Skelton, D. S.
Wilmot, R. C.
Pennefather, E. M,
Webster, J. A. W.
Kelly, H. B.
Dill, M. G.
Meldon, J. B.
Carmichael, D. G.
Dunbar, B. H. V.
Carmichael, J. C. G.
Buchanan, R. J. B.
Wood, A. E. B.
Crawford, J. M. M.
Bramhall, C.
Davidson, P., D.S.O.
Fawcett, H. H. J.
Powell, J.
Wright, T. J.

Foster, R. L. V.
Brakenridge, F. J.
Anderson, H. S.
Irvine, F. S. (18.1.13), Adjutant Depot.
Winckworth, H. C.
Gray, A. C. H.
MacLaughlin, A. M. (17.12.13) San. Offi., Scottish Com.
MacDowall, W. M.
Patch, B. G.
Cotton, F. W.
Turner, F. J.
Pallant, S. L.
MacNicol, R. H.
Wiley, W.
Vaughan, W. F. H.
Sylvester-Bradley, C. R.
Lewis, S. E.
Lambert, F. C.
Wyatt, C. J.
Emerson, H. H. A.
Farrant, P.
Grant, M. F.
Hole, R. B.
Harding, H.
Richmond, J. D.
Ahern, M. D.
Meadows, S. M. W.
Richard, G. H.
Rose, A. M.
Whitehead, E. C.
Glanvill, E. M.
Hanafin, P. J.
Otway, A. L.
Brunskill, J. H.
Osburn, A. C.
Hildreth, H. C.
Ommanney, F. M. M.
Fairbairn, J.
Watson, D. P.
Collins, R. T.
Hull, A. J.
Riach, W.
Sinclair, M.
Douglass, J. H.
Carlyon, A. F.
Parsons, A. R. C.
Cuthbert, J. M.
Lauder, T. C.
McEntire, J. T.
Moore, E. H. M.
Lewis, R. R.
Johnstone, D. P.
Harty, T. E.
Arthur, A. S.
Garland, F. J.
Turnbull, J. A.
Cathcart, G. E.
Noke, F. H.
Dunkerton, N. E.
McConaghy, W.
Bousfield, L.
Carter, H. St. M.
Lloyd Jones, P. A
Maughan, J. St. A
Pascoe, J. S.
Hallowes, A. C.
Clarke, J. B.
Doig, K. A. C.
Luxmoore, E. J. H.
Cahill, R. J.
Dwyer, P.
Gotelee, H. E.
Black, R. B.
Harvey, G. A. D.
Kempthorne, G. A.
Bowle, S. C.
Lithgow, E. G. R.
Lynch, J. P.
Turner, C. H.
Elliot, E. J.
Sutcliff, A. A.
Thurston, L. V.
Wilson, H. T.
Ellis, W. F.

QUARTERMASTERS.

Hon. Lieut. E. W. Newland.
,, Capt. W. J. C. Talbot.
,, ,, H. J. F. Audus.
,, Major J. H. W. Beach.
,, Capt. R. R. Cowan.
,, Major A. Bruce (1.10.11), A.M. Stores, Woolwich.
,, Capt. H. W. Glover.
,, ,, *F. Crookes (30.10.12), A.M. Stores, Dublin.*
,, ,, J. McClay.
,, Lieut. A. Lunney.
,, Capt. A. Wheeler.
,, Lieut. J. Watkins.
,, Major T. F. Brake.
Hon. Capt. H. P. Wakefield.
,, Lieut. J. Gillman.
,, ,, J. Clark.
,, Capt. T. Exton.
,, Major J. B. Short.
,, Capt. R. Scott.
,, ,, A. Wilson.
,, Lieut. W. N. Archibald.
,, Capt. H. Woolley.
,, ,, G. F. Short.
,, Lieut. C. W. Kinsella.
,, Capt. H. Spackman.
,, Lieut. J. W. Osborne.
,, Capt. G. A. Benson.

PROMOTIONS.

SERJEANT-MAJOR.

9800	Qmr.-Serjt.	Renton, W... ..	27.11.10	Vice W. H. Taylor to pension.

LANCE-CORPORAL.

1856	Private ..	Leaney, A. F. ..	24.11.10	Special under para. 281, S.O., R.A.M.C.

DISCHARGES.

6783	S.-Major ..	Taylor, W. H. ..	26.11.10	To pension.
11588	Private ..	Holland, J. T. ..	5.11.10	Free under para. 1058 (ii.) R.W.
12160	,, ..	Woods, F. J. ..	15.11.10	Termination of first period.
12178	,, ..	Knight, D. C. H. ..	29.11.10	,, ,, ,,
12184	,, ..	Holland, P. ..	4.12.10	,, ,, ,,
12183	Corporal ..	Biddle, W. J. ..	4.12.10	,, ,, ,,
17994	Private ..	Peers, J.	11.12.10	Free after 18 years.

TRANSFERS TO ARMY RESERVE.

18084	Pte.	Simpson, H. ..	11.11.10	18136	Pte.	Day, H.	27.11.10
18082	,,	Cox, A. H. ..	9.11.10	1422	,,	Wright, J. ..	28.11.10
18096	,,	Hoedy, F. ..	16.11.10	1409	,,	Palmer, B. M. ..	28.11.10
18098	,,	Ellis, T. G. ..	17.11.10	1421	,,	Rooney, W. ..	28.11.10
1373	,,	Franklin, W. J.	17.11.10	1404	,,	Bawden, C. B. ..	29.11.10
1362	,,	Powell, E. A. ..	17.11.10	1403	,,	Garland, F. J. C.	29.11.10
18099	,,	O'Leary, J. ..	17.11.10	1411	,,	Sturmey, C. B. .	29.11.10
18089	,,	Thatcher, W. J.	16.11.10	1395	,,	Wilkinson, J. ..	27.11.10
18092	,,	Lourigan, W. ..	14.11.10	1416	,,	Pollentine, E. F.	2.12.10
1365	,,	Brown, P. ..	17.11.10	1407	,,	Staples, G. ..	1.12.10
1381	,,	Finnigan, J. ..	18.11.10	1417	,,	Smith, C. ..	3.12.10
1382	,,	Ponsford, G. W.	19.11.10	1423	,,	Atkinson, T. ..	1.12.10
18105	,,	Hare, G. T. ..	18.11.10	18196	,,	White, J. J. ..	2.12.10
1371	,,	Mercer, G. ..	17.11.10	1414	,,	Ball, T.	2.12.10
1380	,,	Cross, F. ..	21.11.10	18139	,,	Leech, A. J. ..	1.12.10
1379	,,	Hughes, W. ..	21.11.10	1419	,,	Bench, I. ..	3.12.10
1378	,,	Elliott, H. ..	20.11.10	1418	,,	Gentry, G. J. ..	3.12.10
1389	,,	Wheatley, F. ..	24.11.10	1436	,,	Glennie, A. W...	8.12.10
1386	,,	Rudge, S. ..	24.11.10	18152	L.-Cpl	Oswald, J. ..	5 12.10
1390	,,	Hackett, T. ..	24.11.10	1444	Pte.	Mirins, S. ..	9.12.10
18120	,,	Dorian, T. ..	23.11.10	1435	,,	Brooks, J. ..	8.12.10
1370	,,	Nagle, C. ..	21.11.10	1431	,,	Dickenson, C. ..	6.12.10
1376	,,	Whelan, T. ..	19.11.10	1441	,,	Beaman, W. ..	9.12.10
1377	,,	Kennedy, M. ..	20.11.10	1449	,,	Sullivan, J. ..	11.12.10
1408	,,	O'Shaughnessy, M.	24.11.10				

TRANSFERS TO OTHER CORPS.

5030	Private ..	Head, L. F... ..	16.11.10	To R. Marine Light Infantry.
5060	,, ..	Wincomb, F. C. ..	17.11.10	,, 4th Hussars.
2044	,, ..	King, J.	15.12.10	,, Royal Horse Artillery.

EMBARKATIONS FOR ABROAD.

To Jamaica, November 25, 1910.

9984	S.-Major ..	Cross, F. C.	12047	Private ..	Eley, H. A.
9958	S.-Serjt. ..	Lovegrove, E. J.	2147	,, ..	Hampson, W. T.
14668	Serjeant ..	Snow, P.	1746	,, ..	McLachlan, E. J.
14464	,, ..	Harran, G. F.	2030	,, ..	Tucker, G. H.
19729	Private ..	Tomlin, J.	2025	,, ..	Dawson, S.
18427	,, ..	Barber, P.	19853	,, ..	Bonrhill, W. A. G.
1400	,, ..	Bamber, E.	1866	,, ..	Ingden, W.

To Bermuda, November 25, 1910.

11066	Qmr.-Serjt.	Lee, H. B.	2151	Private ..	Church, A. W.
18158	Serjeant ..	Pursey, G. P.	193	,, ..	Truscott, H. P.
11807	,, ..	Levey, J.	940	,, ..	Harris, W.
17413	Corporal ..	Tweed, E.	18409	,, ..	Horsfield, F. M.
1856	Private ..	Leaney, A. F.	1276	,, ..	Cooper, H.

DISEMBARKATIONS FROM ABROAD.

From Tientsin, per H.T. "Rohilla," November 29, 1910.

8977	S.-Serjt. ..	Sallis, J.	19634	Private ..	Kelliher, J E.
9357	Corporal ..	Gough, T. G.	19468	,, ..	Jack, G. D.
19882	Private ..	Arscott, E.			

From Hong Kong, per H.T. "Rohilla," November 29, 1910.

9655	S.-Serjt. ..	Riordan, W. R.	570	Private ..	Crooks, G. B.
8836	Qmr.-Serjt.	Petch, G. W.	2214	,, ..	Manning, J. M.
12340	Serjeant ..	Butler, T.	890	,, ..	North, J. P.
14123	,, ..	Winn, H.	86	,, ..	Redfern, W.
15671	,, ..	Cole, R. W.	866	,, ..	Shinn, W.
15072	Corporal ..	Huggett, H.	939	,, ..	Simpkins, G.
15655	Lce.-Corpl.	Caborn, G. J.	19891	,, ..	Walker, G. W.

From Singapore, per H.T. "Rohilla," November 29, 1910.

7712	S.-Major ..	Ford, H. J.	19759	Private ..	Groenaway, B. A.
9720	S.-Serjt. ..	Hyett, P. D.	19859	,, ..	Hicks, L. S.
18253	Serjeant ..	Suter, J.	698	,, ..	Ide, H.
16979	Lce.-Corpl.	Egan, R. V. V.	645	,, ..	Wilkes, J.
609	Private ..	Day, J.	12685	,, ..	Allen, G.
247	,, ..	Doyle, T. J.			

From Ceylon, per H.T. "Rohilla," November 29, 1910.

10047	Qmr.-Serjt.	Figg, C. A.	276	Private ..	Baldwin, T. D.
17319	Lce.-Corpl.	Hort, A. T.	992	,, ..	Killigren, H.
19898	Private ..	Ames, C. M.	19880	,, ..	Parkings, A. L.

From Egypt, per H.T. "Rohilla," November 29, 1910.

17748	Serjeant ..	Dissent, C. H.	18754	Private ..	Bostook, J.
12496	Corporal ..	McKay, J.	19188	,, ..	Smart, E. A.
12411	,, ..	Simes, A. A.	18892	,, ..	Berry, H. G.
18787	Lce.-Corpl.	Stovold, W. T.	18859	,, ..	Day, M.
19023	Private ..	Tarbet, A.			

FROM MALTA, PER H.T. "ROHILLA," NOVEMBER 29, 1910.

18830	Private ..	Bell, F.	18982	Private ..	Newman, A.
18478	,, ..	Burton, A.	18365	,, ..	Thomson, R.
18425	,, ..	Atkinson, F. W.	1920	,, ..	Ford, E. E.
18979	,, ..	Bushnell, S. R.			

FROM GIBRALTAR, PER H.T. "ROHILLA," NOVEMBER 29, 1910.

18355	Private ..	Ogden, L.			

FROM EGYPT, PER H.T. "PLASSY" NOVEMBER 24, 1910.

19011	Private ..	Egan, G. E.	18960	Private ..	Curtis, B.

FROM SOUTH AFRICA, PER H.T. "SOUDAN," DECEMBER 8, 1910.

9722	Qmr.-Serjt.	Tite, W. J.	18444	Private ..	Hall, A. H.
14617	Serjeant ..	Aston, H.	12243	,, ..	Strange, P.
15848	Corporal ..	Garbett-Burbidge, R. E.	1660	,, ..	Totlow, E. E.
18344	Private ..	Hayden, A.	18592	,, ..	Toomey, A. J.

FROM MAURITIUS, PER H.T. "SOUDAN," DECEMBER 8, 1910.

7680	S.-Major ..	Carey, W.	763	Private ..	Desmond, T.
10059	Qmr.-Serjt.	Carnell, G. W.	293	,, ..	Hanchett, G.
18324	Serjeant ..	Parker, D.	19855	,, ..	Kerr, E.
15483	,, ..	Sharp, E.	19674	,, ..	Peters, W. J.
12002	Corporal ..	Knee, W. J.	19782	,, ..	Clover, A. A.
18003	Private ..	Batcock, F.	19368	,, ..	Hazell, J.

FROM MALTA, PET H.T. "DONGOLA," NOVEMBER 9, 1910.

17964	Corporal ..	Bowler, W.	17421	Corporal ..	Plume, P.

THE FOLLOWING N.C.O.'S AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS.

FOR STAFF-SERJEANT.

11563	Serjeant ..	Ward, E. J.	11789	Serjeant ..	Skinner, W.

FOR SERJEANT.

18222	Corporal ..	Dady, A.	19029	Corporal ..	Harvey, R. E.
11741	,, ..	Hudson, H.	17513	,, ..	Gallivan, J.
17870	,, ..	Cragg, E.	18032	,, ..	Burns, J. I.
17102	,, ..	Harvey, D.	11040	,, ..	Stroud, J.
16325	,, ..	Gibbs, A. F.			

FOR CORPORAL.

2147	Private ..	Hampson, W. C.	18312	Private ..	Howitt, J.
14603	,, ..	File, C. J.	18413	,, ..	Cooke, C. W.
1456	,, ..	Hird, F. F.	19254	,, ..	Scales, G. A.
18666	,, ..	Janes, J.	19854	,, ..	Allison, J.
237	,, ..	Flavell, J. E.	42	,, ..	Harding, D. G.

QUALIFIED AS DISPENSERS.

19990	Private ..	Horne, A.	19665	Private ..	Boxall, H. G.
266	,, ..	George, W. E.	19478	,, ..	Pollitt, A.
17102	Corporal ..	Harvey, D.			

Staff-Serjeant A. W. Holding will rejoin the corps from the medical department of Northern Nigeria on January 3, 1911.

The continued employment of Mr. E. Batchelor as Registrar's Clerk at the Royal Victoria Hospital, Netley, has been approved.

Mr. E. J. Smith has been selected for the vacancy on the Civilian Subordinate Staff of the Royal Army Medical College, caused by the resignation of Pensioner J. M. Webb.

DEATHS.

4871	Private ..	Galpin, W. H. ..	14.11.10	Enteric fever, at Aldershot.

PHILLIPS.—At 8, King Street, Fermoy, on November 28, Barbara Morrison, beloved wife of Charles Edward Phillips, late Serjeant-Major R.A.M.C., and daughter of the late Mr. John Macpherson, of Rhynie, Aberdeenshire.

NOTES FROM DUBLIN.—Captain S. Boylan Smith writes. "Several months having elapsed since any notes from Dublin appeared in the CORPS NEWS, the following may prove of interest to readers:—

"On Friday, November 11, an event was decided which was probably the first of its kind in the annals of history of the 14th Company, Royal Army Medical Corps, even if not in the whole Corps itself.

"This event was a cross-country race for the 14th Company, Royal Army Medical Corps Cross Country Challenge Cup, competed for by teams of four members carefully selected by an interested committee. The Cup is a magnificent silver trophy valued at 25 guineas and presented to this Company by the Great Southern and Western Railway Company of Ireland in recognition of the services rendered in connection with the recent Roscrea railway disaster, by a party of an officer, non-commissioned officer, and men of the 14th Company, Royal Army Medical Corps.

"The railway company specially desired to pay some lasting tribute in appreciation of the work done, and the Cup was offered to be competed for annually by teams of footballers, stretcher parties, or cross-country runners, with a stipulation that the individuals immediately concerned should decide the purpose for which the Cup should be competed for.

"It was decided to accept the Cup for cross-country teams, and the running community in the Company, therefore, specially desire that the names of the party who assisted the Railway Company be placed on record as an acknowledgment of the origin of cross-country running in the Company.

"I may add that great assistance was rendered by Captain J. W. West, who is now on his way to India, and it is regretted that he was unable to witness its very successful issue.

"The names of the party already referred to are as under:—

Captain S. Boylan Smith.
Serjeant T. Donnis.

Private R. Hochheimer.	Private J. Collins.
,, H. Sumner.	,, C. Headdock.
,, R. McDonald.	,, E. W. Minns.
,, J. Rule.	,, J. W. Walsh.
,, B. Dempster.	,, T. Jackson.
,, W. Sawers.	,, J. Morris.

Private J. F. Elliott.

"*The Race.*—The course consisted of a carefully-selected track in the Phœnix Park over a distance of nearly 9 miles, which owing to heavy rain for days before the event, was in places ankle-deep in mud and water, which naturally rendered the going very heavy, great difficulty being experienced by the competitors in keeping their feet, several of whom came to grief on more than one occasion during the race. Under ordinary circumstances the course was unusually severe, numerous natural obstacles having to be negotiated.

"From the moment of the selection of the teams some two months ago, the greatest excitement and enthusiasm prevailed. It became necessary to make changes in the teams from time to time owing to several good runners leaving the station, one notable instance in the case of Corporal W. A. Beckett, now stationed at Mauritius.

"On the day of the race, excitement was at fever heat, and promptly at 2.30 p.m. Captain S. B. Smith started the competitors on their journey, whilst Serjeant-Major

J. T. Jackson superintended numerous other details, ably assisted by energetic course stewards.

"In a sense, the race is easily described. At the start Private J. J. Wallace went straight to the head of affairs and made the pace a cracker; however, when the running settled down, he led by about 100 yards from Privates McGibbon, Collins, and Torrance, with the remainder of the field stretched out for nearly half-a-mile, with Corporal Wilson, Privates White and Young whipping in. At 3 miles the leaders were still going strong, with Bugler Collier occupying fifth place, and Private Boon next, with several others behind going well.



Reading from left to right:
Back row—Privates R. Hochheimer, C. Headdock, T. Jackson, J. Rule, W. Sawers, B. Dempster, R. McDonald, J. W. Walsh, and J. Morris.
Centre row—Serjeant-Major J. T. Jackson, Captain S. Boylan Smith, and Serjeant T. Dennis.
Runners—Private H. F. H. Boon, Corporal W. A. Wilson, Private J. C. Collins, and Private W. N. Collier.

"After 5 miles of the journey had been traversed, the leaders were running in fairly close company in front of Private E. F. White, the Club Secretary, who in turn was followed by Bugler Collier, Privates Boon and Walsh with Corporal Wilson and Private Minns making up a lot of ground in good style.

"A mile from home the contest was being fought out between two teams 'A' and 'B.' At this junction Private White, who was wearing down the leaders, left the course and Private Walsh moved up into fifth place.

"One hundred yards from the tape Wallace was still showing the way, but McGibbon came along with a wet sail and got the better of a great finish by 3 yards; 40 yards separated the second and third.

Finishing places; the letters signifying competitor's team.

1 ..	Private J. McGibbon	.. A	9 ..	Private E. Hoult	..	.. E		
2 ..	,, J. J. Wallace	.. D	10 ..	,, E. Turney	..	.. C		
3 ..	,, J. Collins	.. B	11 ..	,, A. Wright	..	.. C		
4 ..	,, D. Torrance	.. A	12 ..	,, E. W. Minns	..	.. C		
5 ..	,, J. W. Walsh	.. A	13 ..	,, J. Knox	..	.. E		
6 ..	Bugler W. N. Collier	.. B	14 ..	,, J. Anderson	..	.. E		
7 ..	Private H. F. H. Boon	.. B	15 ..	,, R. Hochheimer	..	.. A		
8 ..	Corporal W. A. Wilson	.. B	16 ..	,, H. S. Young	..	.. E		

Time 55 minutes 30 seconds.

Points.

A	..	*B*	..	*E*
1	..	3	..	9
4	..	6	..	13
5	..	7	..	14
15	..	8	..	16
25	..	24	..	52

"Private E. F. White, 'C' team and Privates Headdoch, A. MacFarlane and B. Alexander, 'D' team, did not complete the course.

"It is well to mention that 'B' team, the winners of the Cup and Medals for this year, were the only remaining members of the original team and, moreover, were favourites for a long time past.

"The Cup race proved an excellent test of the physical power and endurance of men of the Royal Army Medical Corps who, though engaged in an indoor profession, have to be kept in a state of physical fitness equivalent to that of a trained infantry soldier, in order to carry out their duties in the field, and on the line of march.

"Even on the following day, Private White was first man home for his club in a similar event for the Old Dublin Harriers Invitation Cup from a larger field, and several of the competitors in the Company Cup Race turned out for the County Dublin League Football fixture with the Irish Cavalry Depot, which resulted in a win for the latter by 3 goals to 2, after a very closely-fought game. The deciding goal was obtained in the last ninety seconds.

"The hockey team, although not engaged in any league, have been battling with the best clubs in Dublin, and up to the present have won 1, drawn 2, and lost 1 match. Goals for 6, against 7.

"The Company had an excellent cricket season during the summer.

"Captain R. C. Wilmot proved himself an all-round cricketer with splendid batting and bowling averages.

"Among the N.C.O.'s and men, the presentation bat for the highest batting average fell an easy prey to Corporal W. A. Beckett, while Private D. Torrance secured the presentation ball for the best bowling average in a close competition.

"The next Company Race will be run ere these notes are in print—namely, on November 25, over a distance of 7 miles. This event is a handicap confined to the Company, and already the Club Secretary has received twenty entries, which in itself speaks well for a small unit.

"The following changes have recently taken place in the staff.—

"Lieutenant-Colonel C. Birt has taken over command of 14th Company *vice* Lieutenant-Colonel W. L. Reade, who embarked for Mauritius on October 14, 1910.

"Captain S. B. Smith has taken over Company Officer *vice* Captain R. C. Wilmot, to Royal Army Medical College.

"Captain W. D. C. Kelly has taken over the duties of Specialist in Operative Surgery *vice* Captain J. W. West, to India.

"Captain A. T. Frost has been posted as Specialist in Dermatology.

"Captain W. M. B. Sparkes has taken over the duties of Medical Officer of Staff and Departments, Beggar's Bush, *vice* Major E. G. Browne, who has left for India.

"Captain W. F. Tyndale, C.M.G., has been posted to the Royal Infirmary for duty."

NOTES FROM DEVONPORT.—Lieutenant and Quartermaster C. W. Kinsella R.A.M.C., writes: "Since my last contribution a fairly strenuous time has been spent by both officers and men in connection with training.

"During July and August the 4th Southern General Hospital (Territorial Force), and the 2nd Southern General Hospital (Territorial Force), were mobilised in succession for fourteen days' training each, the *personnel* being put through a comprehensive course of training drawn up by the Surgeon-General Southern Command. At the conclusion of the course the units were inspected by Colonel Jennings, A.M.O., Devonport District, and Colonel Sir J. R. Clark. Six members of the St. John's Ambulance Brigade were also attached during the same period for training in the Home Hospital Reserve.

"To the Royal Army Medical Corps Camp of Instruction formed at Tidworth, No. 7 Company contributed two officers, and sixty-six other ranks, the greater portion of this number, augmented by four officers and forty special reservists also taking part in the medical manœuvres which ensued.

"Local mobilisation of the Coast Defences made further demands on the *personnel*, while for the Inter-Divisional and Army manœuvres, the services of Colonel Jennings and seven officers were requisitioned for service in Dorsetshire, Aldershot, and Salisbury Plain.

"The Surgeon-General Southern Command made his annual inspection of the hospital and company on November 8, the forenoon being devoted to the wards, stores, &c., and the afternoon to parades, drills, and kit inspection. The result has since been notified as 'a satisfactory report.'

"Colonel R. Jennings, A.M.O., followed with his annual inspection on November 16 and 18, and has reported as follows:—

"The Winter Syllabus of Training has now been commenced and includes, for officers, a course of lectures, as below, viz.:—

"'Clearing Hospitals,' by Colonel R. Jennings, A.M.O. 'System of Intercommunication in the Field,' by Major A. E. Haig, General Staff. 'General Organisation of the Medical Services in the Field,' by Lieutenant-Colonel R. Kirkpatrick, C.M.G., R.A.M.C. 'Map Reading,' by Major R. T. Roper, Brigade-Major. 'The Working of the Lines of Communication,' by Major H. A. Boyce, D.A.A. and Q.M.G. 'Organisation of the Sanitary Service in the Field,' by Captain F. Harvey. 'Organisation and Handling of a Division,' by Major A. E. Haig, General Staff, with seven Staff Tours organised by the Principal Medical Officer Southern Command in charge of the M.G. of A., the General Officer Commanding S.W.C.D., and the General Officer Commanding 8th Infantry Brigade, and four exercises in the 'War Game.'

"The first two lectures of the series (followed by discussions), were delivered on November 25 and December 9 respectively.

"The Syllabus for the junior ranks embraces twenty lectures and fourteen drills and exercises, the subjects ranging from 'First Aid' to 'A.S.C. Signals in Wagon Drill.'

"The following postings have taken place:—

"Officers: Lieutenant Gilmour, Aldershot to Devonport; Captains MacDowall, Skelton and Glanvill, Devonport to Royal Army Medical College; Captain Bousfield, Egypt to Devonport; Captain Carlyon, West Coast to Devonport; Captain Beatty, London to Fort Tregantle; Major Packer, Devonport to Exeter (temporarily), *vice* Lieutenant-Colonel Corkery, R.P., who vacates his appointment, pending arrival of Lieutenant-Colonel Elkington from Queenstown.

"N.C.O.'s: Serjeant Blanks, Devonport to Bodmin; Staff-Serjeant Cross, Depot Aldershot to Taunton; Serjeant Jones, Devonport to Cosham; Serjeant Preston, Devonport to H.T. 'Rewa'; Staff-Serjeant McMahon, Devonport to Exeter.

"At the recent examination Staff-Serjeant McMahon and Serjeant George were successful in obtaining 1st Class Certificates of Education.

"The Matron-in-Chief visited the hospital on December 2 and inspected the nursing arrangements, with Miss Payne, Matron Q.A.I.M.N.S., whom we are all glad to welcome back from sick leave.

"Several items for the festive season are in hand, of which an account will be included in my next contribution."

NOTES FROM ALDERSHOT.—Serjeant-Major Roberts writes: "Captain A. D. Jameson, R.A.M.C., goes on leave from December 15, 1910, till January 14, 1911, and Captain J. W. Langstaff, R.A.M.C., from December 9, 1910, till January 4, 1911.

"Miss E. A. Cox, Matron Q.A.I.M.N.S. embarked for South Africa per Hired Transport 'Rohilla,' December 14, 1910; Miss I. G. Willetts, Matron Q.A.I.M.N.S., has arrived at the Connaught Hospital for duty from the Royal Academy, Woolwich.

"Serjeant-Major H. J. Ford, from Singapore, has been ordered to Netley for duty; Serjeant-Major F. O. Chappell, from Malta, proceeds to Hilsea, in relief of Serjeant-Major Stanley, who proceeds to Bulford; Serjeant-Major W. Carey, from Mauritius,

has proceeded on leave; Serjeant-Major C. A. Figg, from Ceylon, has been posted to the Cambridge Hospital.

"FOOTBALL—CORPS TEAM.

"*November*, 23 1910.—Versus *1st Battalion Norfolk Regiment*. Score, 1—1. This game should have been won by our team, and would have been had they accepted the many easy chances that came their way. The goal was scored by Gillam with a ripping shot at about 16 yards range. Ellis missed lamentably when out by himself and only the goal-keeper to beat. The weather was vile, rain and sleet rendering football almost farcical. Our opponents adapted themselves to the prevailing conditions by kicking hard and often.

"*November* 26, 1910.—Versus *Royal Engineers*, Amateur Cup. Result, 5—0 against. The writer did not see this game, so will leave the score to speak for itself.

"*November* 21, 1910.—Versus *2nd Royal Dublin Fusiliers*. Result, 2—1 against. Here was an instance of the spoils going to the hardest workers, the victors playing a game typical of Aldershot military football,—*i.e.*, strenuous work from start to finish, never giving up, kicking hard and often and leaving science to others. There is not the slightest doubt that our team was the better side in this encounter, yet lost."

"HARWOOD CHALLENGE CUP COMPETITIONS.

"*November* 25, 1910.—'*B*' *Company Depot* versus *No.* 11 *Company*.—Result, 7—0. A good game up to the interval with the Dover Team leading 2—0, afterwards it was only a question of how many goals they would win by. The victors have a very useful team.

"*November* 26, 1910.—*No* 2 *Company* versus *No.* 6 *Company*. Result, 8—1 in favour of No. 2 Company: No 6 Company were the visitors to Aldershot, and being the victors of the strong No. 1 Company team, were held in great respect by their opponents. The game was a splendidly contested one up to the interval, Wylie scoring first goal for No. 2 Company with a good shot from an excellent pass from Ellis. No. 6 were, however, not dismayed and equalised through Dale some ten minutes later, who was, however, lucky to receive the ball from an opponent when so favourably placed. No. 2's second goal, scored by Wylie, was a very doubtful one. A little later No. 6 had hard luck, the inside right striking the crossbar with a good shot. Some eight minutes from time the right half of No. 2 (Walkley) sent his wing along with a well-judged pass and Ellis receiving scored a fine goal. No. 6 never gave up but played splendidly, and were dangerous to the last. The following was the outcome of the above game:

"*Stanhope Lines, Aldershot.*
"*December* 3, 1910.

"Hon. Secretary No. 2 Company, Royal Army Medical Corps Football Club.

"Sir,—To inform you that the protest lodged against your Football Club on account of your breaking the rules by not providing a registered referee was upheld.

"It was decided that the match be replayed on or before Monday the 12th inst., No 6 Company, Royal Army Medical Corps Football Club, having the choice of ground. They have also been informed that neutral linesmen must be provided in order that the rules of the Army Football Association be complied with.

"(*Signed*) H. WILLIAMS, *Staff Sergeant*,
"*For Major R.A.M.C.*
"*Hon. Secretary H.C.C.C.*

"Replayed at Cosham on December 10, and after a hard-fought game resulted in a win for No. 2 Company by 3 goals to 2. The encounter was full of incident from start to finish, No. 2 asserting themselves in no uncertain style during the initial period, scoring 2 fine goals per Wylie (centre), and Griffiths (inside right), the latter's shot being a delightful effort. On resuming, No 6 played with great spirit and were awarded a penalty which Dale sent yards wide. Hereabouts they were playing well, and Corporal Hayter headed in from a scrimmage; this success inspired them, and Hannor (centre) was left in a favourable position due to indecision on the part of the backs, when he promptly netted, making the score equal. Then the fun began, each striving for the winning point, but No. 2 Company played better towards the finish, Ellis (inside right) shooting a fine goal three minutes from time, the ball going off the side of the back's head. The game was a keen and interesting one played under adverse conditions.

"The teams were No. 2 Company: Turnbull, Roberts, Gardiner, Walkley, Stanton, Harrison, Ellis, Wilson, Wylie, Griffiths, Haigh; No. 6 Company: Marshall, Turner,

Hayter, Sanders, Hahner, Rouse, Curtiss, Brown, Dale, Smith Kelsey. No. 2 Company now meet No. 20 in the Semi-final, and the winners meet No. 10 Company in the final."

NOTES FROM SIMLA.—Lieutenant-Colonel R. S. F. Henderson, V.H.S., R.A.M.C., Secretary to the Principal Medical Officer, His Majesty's Forces in India, writes as follows, dated November 17, 1910:—

"*Appointments.*—Major D. Harvey, V.H.S., R.A.M.C., proceeding on leave is appointed to the medical charge of 10th Transport 'Rewa' leaving Karachi on March 31, 1911, *vice* Captain C. G. Thomson, who will proceed on duty.

"*Leave.*—Major L. P. More, 2nd (Rawalpindi) Division, granted eight months' combined leave from October 29, 1910.

"Colonel F. B. Maclean rejoined his appointment as Principal Medical Officer 7th (Meerut) Division, on return from leave on October 30, 1910.

"Colonel M. W. Kerin, officiating Principal Medical Officer 7th (Meerut) Division rejoined his substantive appointment as Principal Medical Officer Bareilly, Garhwal and Dehra Dun Brigades, on the return of Colonel F. B. Maclean from leave.

"*Postings.*—The following changes are made in the list of postings of Royal Army Medical Corps Officers coming out for a fresh tour in India; Major H. G. F. Stallard, from the 5th (Mhow) to the 7th (Meerut) Division; Captain F. W. W. Dawson, from the 7th(Meerut) to the 5th (Mhow) Division.

"*Specialists.*—The following officers are appointed specialists in 'Prevention of disease.' Captain H. C. R. Hime, Madras; Captain R. G. H. Tate, Ambala."

SPECIAL RESERVE OF OFFICERS.

Royal Army Medical Corps.

The undermentioned Lieutenants are seconded for service with the Medical Unit of the Edinburgh University Contingent, Officers' Training Corps. Dated October 1, 1910, William Darling, M.B., John M. Darling, M.B.

Lieutenant Thomas McEwen is confirmed in his rank.

To be Lieutenants (on probation): John Phethean Charnock, M.B., dated October 28, 1910; Cadet Corporal William Ross Gardner, from the Edinburgh University Contingent, Officers' Training Corps, dated November 18, 1910.

TERRITORIAL FORCE.

Royal Field Artillery.

4th Welsh Brigade, Royal Field Artillery.—Surgeon-Lieutenant John O'Keefe resigns his commission, dated December 7, 1910.

Royal Army Medical Corps.

North Midland Mounted Brigade Field Ambulance, Royal Army Medical Corps.—Lieutenant William M. Hewetson, M.B., is seconded under the conditions of paragraph 114 of the Territorial Force Regulations, dated September 25, 1910.

3rd Highland Field Ambulance, Royal Army Medical Corps. — William Latto Robertson, M.B., F.R.C.S.(Edin.), to be Lieutenant, dated October 19, 1910.

2nd Home Counties Field Ambulance, Royal Army Medical Corps.—Edwin Augustus Houchin to be Lieutenant (to be supernumerary), dated October 12, 1910.

1st Home Counties Field Ambulance, Royal Army Medical Corps.—Lieutenant Bertram C. A. Leeper resigns his commission, dated November 26, 1910.

2nd Highland Field Ambulance, Royal Army Medical Corps.— Lieutenant Lewis D. Cruickshank, M.B., to be Captain, dated November 7, 1910.

3rd East Anglian Field Ambulance, Royal Army Medical Corps. -Walter Rowland Southall Roberts, M.B., to be Lieutenant (to be supernumerary), dated November 1, 1910.

3rd Northumbrian Field Ambulance, Royal Army Medical Corps.—Lieutenant Abram C. Barker, M.B., resigns his commission, dated December 10, 1910.

2nd West Riding Field Ambulance, Royal Army Medical Corps.—Quartermaster and Honorary Lieutenant James Boswell is granted the honorary rank of Captain, dated November 11, 1910.

Officers attached to Units other than Medical Units.

Lieutenant William Duncan, M.B., to be Captain, dated September 26, 1910.

Lieutenant William M. Fergusson to be Captain, dated October 15, 1910.

Major Thomas Holt, M.B., from the 2nd East Lancashire Field Ambulance, Royal Army Medical Corps, to be Major, dated November 19, 1910.

Allan Freer Rutherford, M.B. (late Captain, 4th Battalion, The King's Own (Royal Lancaster Regiment), to be Captain, dated November 12, 1910.

Surgeon-Lieutenant David Elliott Dickson, M.B., F.R.C.S.(Edin.), from the 7th (Fife) Battalion, The Black Watch (Royal Highlanders), to be Captain, dated April 1, 1908.

Lieutenant William E. F. Tinley, M.D., to be Captain, dated October 1, 1910.

Major Andrew P. Arnold resigns his commission, dated November 26, 1910.

Lieutenant Frank M. Bingham resigns his commission, dated November 26, 1910.

Arthur Henry Falkner, late Lieutenant, 5th Battalion, The King's Own (Royal Lancaster Regiment), to be Lieutenant, dated November 26, 1910.

Captain John W. T. Walker, M.B., F.R.C.S., resigns his commission, dated December 10, 1910.

TERRITORIAL FORCE RESERVE.

ROYAL ARMY MEDICAL CORPS.

Captain Harry Armitage Robinson, M.D., from the Territorial Royal Army Medical Corps, to be Captain, with precedence as in the Territorial Force, dated November 26, 1910.

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

The following lady has received an appointment as Staff Nurse; Miss E. M. Whittall.

Postings and Transfers.—Matrons: Miss I. G. Willetts, to Connaught Hospital, Aldershot, from Royal Military Academy, Cadets' Hospital, Woolwich; Miss M. Mark, to Military Hospital, Curragh, from Royal Victoria Hospital, Netley; Miss J. Hoadley, to Malta, from Military Hospital, Curragh. Sisters: Miss E. J. Minns, to Royal Military Academy, Cadets' Hospital, Woolwich, from Military Hospital, Curragh; Miss S. Richards, to Royal Victoria Hospital, Netley, from Malta; Miss G. M. Smith, to Military Hospital, Shorncliffe, on return from Egypt; Miss D. D. Tripp, to Royal Herbert Hospital, Woolwich, from Connaught Hospital, Aldershot; Miss A. B. Cameron, to Connaught Hospital, Aldershot, from Royal Herbert Hospital, Woolwich; Miss D. M. Taylor, to the Alexandra Hospital, Cosham, on return from Egypt; Miss E. Barber, to Cambridge Hospital, Aldershot, from Military Hospital, Devonport. Staff Nurses: Miss L. A. Burgess, to Military Hospital, Devonport, from Connaught Hospital, Aldershot; Miss M. I. Taylor, to Royal Infirmary, Dublin, from Military Hospital, Shorncliffe; Miss D. C. Isaacson, to the Queen Alexandra Military Hospital, London, S.W., from Military Hospital, Tidworth: Miss K. C. P. H. Brewer, to Military Hospital, Tidworth, from the Queen Alexandra Military Hospital, London, S.W.

Promotions.—The under-mentioned Sisters to be Matrons: Miss M. Mark, Miss I. G. Willetts. The under-mentioned Staff Nurses to be Sisters: Miss M. Davis, Miss E. K. Kaberry.

Arrivals.—From Malta: Miss M. J. Hepple, Sister; Miss S. Richards, Sister; Miss M. B. Williams, Sister.

WARRANT OFFICERS' AND SERJEANTS' (PAST AND PRESENT) ANNUAL DINNER CLUB.

A Committee Meeting of the above club has been arranged to be held in the Serjeants' Mess, Grosvenor Road, London, S.W., at 4 p.m., on Saturday, January 14, 1911.

BUSINESS:

To settle date of Annual Dinner, discuss all details connected therewith, and to elect a sub-committee to carry out the details.

Since the notice which appeared in the last issue of the Corps News the following new members have joined: Staff-Serjeant W. Clegg; Serjeants A. Bush, H. Dixon, E. J. Hill, F. A. Shilbrooke, and C. Wilson.

FREEMASONRY.

THE "IN ARDUIS FIDELIS" LODGE, No. 3432 E.C.
For Members of the R.A.M.C. and R.A.M.C.T.

AT an Emergency Meeting of the above Lodge, held at the Freemasons' Hall on Thursday, July 21, 1910, it was proposed by Bro. Treasurer, and seconded by the W.M. and unanimously carried:—

"That the privileges of a Founder be allowed to all members of the Royal Army Medical Corps, Regular and Territorial, who would have been willing to sign the petition for the formation of the Lodge to the Grand Lodge of England, but who were prevented from doing so either by reason of the shortness of the time or through the fact that they were unaware of the petition for the formation of the 'In Arduis Fidelis' Lodge being presented, on payment of the Founder's fee over and above the Joining fee. All such members of the Corps must claim this privilege within six months of the passing and confirmation of this resolution. Failing which they can only join the Lodge as 'Joining Members.'"

The List of Founders will close on the first Thursday in April, 1911, viz., Thursday, April 6.

This Lodge meets in London on the first Thursday in every month, except the months of July, August, and September, at the Freemasons' Hall, Great Queen Street, Aldwych, W.C.

	£	s.	d.
Founder's Fee	1	1	0
Joining Fee	1	1	0
Annual Subscription	1	1	0
,, ,, (if residing over 20 miles from London)	0	10	6
Founders' Jewel (under the above resolution)	1	1	0
Initiation Fee	5	5	0

This Lodge was consecrated on March 3, 1910, by the Grand Secretary Sir Edward Letchworth, F.S.A.

The original number of Founders was twenty-seven, the strength of the Lodge is now 100.

One regular banquet only is held in the year and that on Installation night, the first Thursday in March, the cost of the banquet being shared by those present.

W. Bro. Captain A. R. Owst, F.R.C.S., R.A.M.C.T., P.P.J.G.D., Surrey, is the present W.M., and the list of members contains the names of many well-known officers.

It is hoped that this Lodge may be a link uniting all, both the individual members and all branches of the Army Medical Service at home and throughout the Empire, as the "Ubique" does the Royal Artillery and "Nil sine Labore," the Army Service Corps.

Any further information concerning this Lodge will be gladly supplied, either by Captain Langford Lloyd, D.S.O., R.A.M.C., the Treasurer, or Quartermaster-Serjeant Chas. Rothschild, R.A.M.C.T., the Secretary of the Lodge, 51, Calthorpe Street, Gray's Inn Road, London, W.C.

THE GARDEN CITIES AND TOWN PLANNING ASSOCIATION.

WE have received the following appeal from the Honorary Treasurer:—

The Garden City Association (now called the Garden Cities and Town Planning Association) was founded eleven years ago, in 1899, for the purpose of giving effect to the proposals formulated in 1898 by Mr. Howard in his book called "Garden Cities of To-morrow."[1] It is the only Society which advocates and organises the control of a separate town or city, with a fixed relation to surrounding agricultural land. Under the auspices of the Association the First Garden City has been established at Letchworth in accordance with the principles laid down in Mr. Howard's book, with such modifications as were found to be desirable in their practical application. Letchworth is now a considerable and rapidly increasing town, where industries of many kinds are being carried on with their attendant population, and it is thus already an object lesson of many of the advantages of the Garden City scheme. The Hampstead Garden Suburb

[1] Published by Swan Sonnenschein and Co., Limited.

and the present development of a smaller garden suburb estate known as Valentines, at Ilford, bear witness in Outer London to the force of an idea which is also manifested at Harborne, Woodlands, Bristol, and elsewhere in the United Kingdom. But Letchworth remains the pioneer and prime example of the principles advocated by the Association.

These principles, moreover, are rapidly spreading across the seas, and the Association is already connected with kindred societies in France, Germany, Italy, Belgium and Russia, as well as in the United States of America.

We consider that these results constitute a worthy record for the Association, attained by persistent care and energy in the face of many difficulties, even now that some early scepticism has almost disappeared. Hundreds of foreign students of the problems involved in the planning of cities and the housing of their citizens have, during the last few years, visited England under the direct auspices of our Association. Arrangements were made for two large parties to visit this country this summer, and for a return visit to Germany in September.

The operation of the new Housing and Town Planning Act now calls for serious and zealous attention; and in making this appeal for fresh support, we may claim that the Association is largely responsible for the great practical interest in garden city and and garden suburb schemes. At the same time we may point out that, useful and praiseworthy as the efforts to create garden suburbs and garden villages are, it would be a grievous mistake to treat them as a complete realisation of, or satisfactory substitution for, Mr. Howard's proposals. The complete divorce from Nature suffered by the denizens of our Metropolis and other great manufacturing towns is, in the belief of our Association, detrimental not only to the health and physique, but to the moral well-being and character of our countrymen, and the development of the true Garden City scheme, with its decentralisation of industry, alone affords to the artizan the opportunity of combining the advantages of town and country life.

Owing to the increased work and responsibility thrown upon it, the Association feels the necessity of largely increasing both its membership and resources. The welfare of our race in the future depends upon a satisfactory solution of the difficulty of securing healthy and happy conditions of life for the industrial worker and his family, and it is sincerely hoped that those who feel the importance of the subject in its physical and moral aspects, will now lend their aid by becoming members of the Association and subscribing to its funds.

You are, therefore, earnestly invited to subscribe according to your means and will. A minimum subscription of 10s. entitles a subscriber to the magazine, "Garden Cities and Town Planning," which is being enlarged and will contain several new and attractive features.

31 *and* 32, *Birkbeck Bank Chambers,*
Holborn,
London, W.C.

UNITED SERVICES MEDICAL SOCIETY.

THE next meeting of the above-named Society will be held at the Royal Army Medical College, Grosvenor Road, S.W., on Wednesday, January 11, 1911, at 5 p.m., when papers will be read by Lieutenant-Colonel C. H. Melville, R.A.M.C., on "What is essential and what is superfluous in the Infantry soldier's load?" and Captain W. A. Woodside, R.A.M.C., on "Pertaining to Territorial Medical Units."

ARMY MEDICAL OFFICERS' BENEVOLENT SOCIETY AND ROYAL ARMY MEDICAL CORPS FUND.

Change of Address.

THE office of the Army Medical Officers' Benevolent Society and Royal Army Medical Corps Fund has been changed to 10, Comeragh Road, W. All correspondence should be addressed to the secretary, Lieutenant-Colonel F. W. H. Davie Harris, at that address.

BIRTHS.

POE.—On November 5, 1910, at Bloemfontein, South Africa, the wife of Major J. Poe, R.A.M.C., of a son.

PARRY.—At Knole, Maidstone, on December 6, the wife of Captain F. M. Parry, R.A.M.C., a son.

COWAN.—On December 10, at 135, Herbert Road, Woolwich, the wife of Major J. Cowan, R A.M.C., of a daughter.

DEATHS.

SINCLAIR.—At Belfast, on November 21, 1910, Surgeon-Major-General James Sinclair, M.D., K.H.P., retired, aged 78. He entered the Service as Assistant Surgeon (Staff) on August 5, 1853; served in the 2nd Foot, 33rd Foot, and Army Medical Department; became Surgeon, July 29, 1862: Surgeon-Major (specially promoted for distinguished service in Abyssinia), August 15, 1868; Deputy-Surgeon-General, May 9, 1876; Surgeon-General, March 27, 1882, and retired on retired pay on March 28, 1892. His war service was.: Abyssinian Expedition, 1867-8. Storming and capture of Magdala. Despatches, *London Gazette*, July 10, 1868. Medal, and promoted Surgeon-Major. South African War, 1881. Transvaal Campaign. He was appointed Honorary Physician to the Queen on August 5, 1896.

The *Belfast Evening Telegraph* of November 22 contained a long and sympathetic obituary notice of Surgeon-Major-General Sinclair, from which we have taken the following extract:—

"Surgeon-Major-General Sinclair was born on March 28, 1832, at Berwick-on-Tweed, where his grandfather had settled on the disbandment of the Caithness Fencibles. He studied medicine at the University of Edinburgh from 1849 until the year 1853, when he took the degree of Doctor of Medicine, and became a Member of the Royal College of Surgeons. In June, 1853, he obtained his commission in the Medical Department, and joined the Service at Fort Pitt. Soon after he proceeded to Ceylon as a Staff-Assistant-Surgeon and remained there till 1857, when he returned to England. His next foreign service was in Malta as Assistant-Surgeon to the 2nd Queen's Royal Regiment. From Malta he accompanied the regiment to the Ionian Islands and Gibraltar. On returning to England in 1863, he was placed in medical charge of the 6th Depot Battalion at Walmer. In 1865 he was gazetted Surgeon to the 33rd Regiment, and joined it at Poona. In 1867 he proceeded in medical charge of the Regiment to Abyssinia, and was present at the capture of Magdala. He was specially promoted to the rank of Surgeon-Major for his distinguished services during the campaign. He served at home till 1876, when he was promoted to the rank of Deputy-Surgeon-General, and was sent to Bermuda as Principal Medical Officer, returning to England in 1879. He served with the Field Force in Natal during the first Boer War in 1881. In 1882 he was promoted to the rank of Surgeon-General, and posted to Ireland as Principal Medical Officer. He served as Principal Medical Officer in Malta from 1883 to 1888, when he was again posted to Ireland and served as Principal Medical Officer till his retirement in 1892.

"He was buried with military honours at the City Cemetery on November 23, 1910."

The paper refers in glowing terms to Surgeon-Major-General Sinclair's many good qualities, and to the loss sustained by Belfast on his decease.

MACKENZIE.—At Dover, on December 6, 1910, Brigade-Surgeon John Mackenzie, M.D., retired pay, late Army Medical Department, aged 77. He entered the Service as Assistant-Surgeon (Staff) on August 5, 1858; served in the 10th and 62nd Foot; became Surgeon, Army Medical Department, March 1, 1873; Surgeon-Major, April 1, 1873; Brigade-Surgeon, September 10, 1884, and retired on retired pay, February 24, 1888. His war service was: Chinese War, 1860; Campaign in North China. Medal.

MURRAY.—At Gipsy Hill, London, S.E., on November 17, 1910, Brigade-Surgeon-Lieutenant-Colonel John Ross Murray, M.D., F.R.C.S.Edin., retired. Late Army Medical Staff, aged 73. He entered the Service as Assistant-Surgeon (Staff) on June 15, 1861; served in the Royal Artillery and 107th Foot; became Surgeon, Army Medical Department, March 1, 1873; Surgeon-Major, November 29, 1875; Brigade-Surgeon, April 1, 1889, and retired on retired pay, October 31, 1892. His war service was: New Zealand War, 1860-1; Actions of Puketakauere, Mahoetahi, and Matarikoriko. Medal.

EXCHANGES, &c.

The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, Serle Street, London, W.C., not later than the 22nd of the month.

A free issue of twenty-five excerpts will be made to contributors of all articles classified under the heading of Original Communications, Lectures, Travels, and Proceedings of the United Services Medical Society.

Any demand for excerpts, additional to the above, or for reprints, must be forwarded at the time of submission of the article for publication, and will be charged for at the following rates, and additional copies at proportionate rates:—

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	8	0 6 9	0 3 2						
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	8	0 9 0	0 4 4						
	16	0 16 9	0 6 9						
200	4	0 8 6	0 4 0	9	0	6	3	7 6	4 0
	8	0 13 6	0 6 0						
	16	1 3 6	0 8 9						

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Cases for Binding Volumes.—Strong and useful cases for binding can be obtained from the publishers at the undermentioned rates:—

Covers, 1s. 4d. net; binding, 1s. 2d.

These charges are exclusive of cost of postage.

In forwarding parts for binding the name and address of sender should be enclosed in parcel.

All Applications for Advertisements to be made to—

G. STREET & CO., Ltd., 8, Serle Street, London, W.C.

The back outside cover is not available for advertisements.

MANAGER'S NOTICES.

The JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January, but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in March and September of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters regarding non-delivery of the Journal, or change of address, should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and reach there not later than the 20th of each month.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

THE HON. MANAGER,
"JOURNAL OF THE ROYAL ARMY MEDICAL CORPS,"
WAR OFFICE, WHITEHALL, S.W.

Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notified at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Sir Rubert Boyce, Captain W. F. Reichwald, R.H.A., Captain W. R. Galwey, Major W. W. O. Beveridge, Captain J. H. P. Graham, Major G. A. Stoney-Archer, Major G. A. Stephens, R.A.M.C. (T.F.), Major J. P. Silver, Lieutenant-Colonel H. Gordon-Hall, Major W. E. Hudleston, Captain C. W. Holden, Major J. G. McNaught.

The following publications have been received:—

British: The Indian Medical Journal, Guy's Hospital Gazette, Medical Press and Circular, The Army Service Corps Quarterly, The Royal Engineers' Journal, The St. Thomas's Hospital Gazette, The Practitioner, Proceedings of the Royal Society of Medicine, St. Bartholomew's Hospital Journal, The Lancet, Red Cross and Ambulance News, The Journal of Tropical Veterinary Science, Public Health, Journal of the Royal Sanitary Institute, The Army Service Corps Journal, The Hospital, Indian Medical Gazette, The Medical Review, Sleeping Sickness Bureau, The Shield, The Middlesex Hospital Journal, Medical Guide, Transvaal Medical Journal.

Foreign: Archiv. für Schiffs-und Tropen-Hygiene, Norsk Tidsskrift for Militaermedicin, Archives de Médicine Navale, Paris Médical, Le Caducée, Archives de Médecine et de Pharmacie Militaires, Revista de Sanidad Militar y La Medicina Militar Espanola, United States Department of Agriculture, Leçons de Chirurgie de Guerre, Giornale di Medicina Militare, The Military Surgeon, Russian Medical Journal, Annali di Medicina Navale e Coloniale.

JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS.

Corps News.

FEBRUARY, 1911.

ROYAL ARMY MEDICAL CORPS.

Lieutenant Bernard G. Goodwin resigns his commission. Dated December 21, 1910.

Quartermaster and Honorary Captain Arthur J. Pilgrim retires on retired pay. Dated January 11, 1911.

Lieutenant-Colonels B. M. Skinner, M.V.O., and H. N. Thompson, D.S.O., have been appointed Honorary Surgeons to His Excellency the Viceroy of India.

ARRIVALS HOME FOR DUTY.—From India: On December 22, Captains W. F. Ellis, H. T. Wilson, and L. V. Thurston On January 6, Lieutenant-Colonel A. E. Morris, Captains A. B. Smallman and A. W. Gater.

POSTINGS.—Captain W. F. Ellis, Northern Command; Captain A. B. Smallman, Eastern Command; Captain H. T. Wilson, Southern Command; Lieutenant-Colonel A. E. Morris, Captains L. V. Thurston and A. W. Gater, Irish Command.

TRANSFERS.—Lieutenant-Colonel T. E. Noding from Cork to Hilsea. The transfer of Captain J. T. McEntire from the Northern to the Irish Command notified in last month's journal has been cancelled.

APPOINTMENTS.—Lieutenant-Colonel C. W. Johnson, charge of Military Hospital, Bulford; Lieutenant-Colonel A. E. Morris, charge of Military Hospital, Cork.

QUALIFICATION.—Lieutenant W. P. MacArthur has obtained the Diploma in Public Health of the University of Oxford.

ARRIVALS HOME ON LEAVE.—Colonel G. W. Robinson, Captains M. H. Babington and W. L. Baker.

EMBARKATIONS.

For India.—On January 5, Major C. H. Hale, D.S.O., Captains W. C. Croly, F. W. Lambelle, and J. E. H. Gatt. On January 18, Majors W. G. Beyts and W. H. S. Nickerson, V.C., Captain J. T. Johnson.

For South Africa.—On December 14, Captain A. C. Adderley, Lieutenant J. James. On December 21, Lieutenants A. M. Pollard, G. S. Parkinson, and W. Mathieson.

For Jamaica.—On December 10, Captain T. J. Potter on special duty under the Colonial Office.

Quartermaster and Honorary Captain F. W. Hall embarked for South Africa on December 21, 1910.

RESULTS OF EXAMINATIONS.

Passed for promotion to the rank of Captain in (*b*): J. H. Gurley; H. R. Edwards; C. G. Sherlock, M.D.; J. R. Yourrell, M.B.; R. C. Priest, M.B.; G. P. Taylor, M.D.; D. E. C. Pottinger, M.B.

ROSTER FOR SERVICE ABROAD.

The following additions, &c., should be made in the roster published in the Journal for January :—

The name of Lieutenant-Colonel M. O'Halloran was inadvertently included in the list of Majors, and should be inserted next below that of Lieutenant-Colonel F. H. Treherne.

Captain J. Powell's name should be erased.

Captains H. R. Bateman and A. E. Hamerton, D.S.O., on return from special service in Uganda take position next below Captain J. C. G. Carmichael.

DISCHARGES.

9655	S.-Serjt. ..	Riordan, W. R. ..	15.12.10	At own request, after 18 years.
9486	,, ..	Tempest, L. E. W.	31.12.10	Medically unfit.
9849	Corporal ..	Graham, D... ..	31.12.10	At own request, after 18 years.
8657	Lce.-Serjt.	Skeet, H.	31.12.10	Termination of second period.
8669	,, ..	Munden, W. ..	13. 1.11	,, ,, ,,
5211	Private ..	Wilson, R.	12.12.10	On payment of £10.
12211	,, ..	Carlton, C.	15.12.10	Termination of first period.
243	,, ..	Woodhead, F. N. ..	30.11.10	On payment of £18.
17021	,, ..	Crisp, E.	1. 1.11	Termination of first period.
12274	,, ..	Balcam, E. F. ..	16. 1.11	,, ,, ,,
12213	,, ..	Strange, P... ..	8. 1.11	,, ,, ,,

TRANSFERS TO ARMY RESERVE.

1443	Pte.	Nicholls, G. W.	10.12.10	18214	Pte.	Celler, H. H. ..	4. 1.11
1444	,,	White, H. ..	10.12.10	1499	,,	Pattie, R. ..	6. 1.11
1451	,,	Penny, A. ..	12.12.10	1489	,,	Kelliher, D. ..	3. 1.11
1439	,,	Ramsey, W. D.	11 12.10	1511	,,	Buckley, J. D...	2. 1.11
1454	,,	Headington, A.	16.12.10	1476	,,	Hunt, W. ..	2. 1.11
1462	,,	Reed, W. P. ..	19.12.10	1494	,,	Rowden, M. ..	5. 1.11
1453	,,	Dickinson, J. ..	16.12.10	1500	,,	Boccins, H. A...	6. 1.11
1457	,,	Tobin, D. ..	12.12.10	1479	,,	Clayton, R. J. ..	1. 1.11
18172	,,	Cooper, J. H. ..	14.12.10	1495	,,	Stevens, B. ..	5. 1.11
1450	,,	Hare, G. M. ..	12.12.10	1502	,,	Bennison, F. ..	6. 1.11
18171	,,	Wood, G. E. ..	12.12.10	19985	,,	Parker. P. J. H. H.	6. 1.11
1459	,,	Stuckey, B. ..	16.12.10	18240	L.-Sjt.	Johnson, W. B. T.	11. 1.11
1452	,,	Guyton, H. W.	16.12.10	1523	Pte.	Weston, W. ..	7. 1.11
1465	,,	Smart, W. W...	22.12 10	18232	,,	De Boos, H. ..	8. 1.11
18183	,,	Cooper, C. B. ..	28.12.10	1524	,,	Knight, F. A. ..	7. 1.11
1471	,,	Cove, E. A. ..	30.12.10	18228	,,	Knott, A. E. ..	7. 1.11
18194	,,	Turner, A. W...	30.12 10	18231	L.-Cpl.	Barden, J. ..	8. 1.11
18191	,,	Farrell, J. ..	30.12.10	1516	Pte.	Day, F. G. ..	8. 1.11
1470	,,	Hayes, R. C. ..	29.12.10	18235	,,	Harding, G. ..	8. 1.11
18195	,,	Wallace, R. ..	30.12.10	1517	,,	Allen, W. L. ..	9. 1.11
1478	,,	Ryan, J. ..	30.12.10	1507	,,	Godwin, C. F. E.	9. 1.11
1487	,,	Barry, A. E. ..	30.12.10	1677	,,	Green, H. ..	11. 1.11
1477	,,	Connolly, J. ..	31.12.10	1506	,,	Inman, W. G. ..	9. 1.11
1482	,,	Proctor, B. ..	2. 1.11	1528	,,	Miles, G. ..	9. 1.11
1481	,,	Larkin, L. ..	1. 1.11	1518	,,	Sawyer, C. ..	9. 1.11
18209	,,	Taylor, C. A. ..	5. 1.11	1529	,,	Thompson, W. G.	12. 1.11
1492	,,	Jacobs, A. ..	5. 1.11	1537	,,	Johnston, J. ..	12. 1.11
1513	,,	Lines, F. A. ..	7. 1.11	1503	,,	Duncan, R. ..	7. 1.11
1549	,,	Flannery, W. F.	5. 1.11	18244	,,	Corvie, G. J. ..	11. 1.11
1488	,,	Essex, T. ..	1. 1.11	1526	,,	Brown, R. ..	8. 1.11
18203	,,	Houghton, W...	2. 1.11	18236	,,	Antill, F. ..	9. 1.11

PROMOTIONS.

LANCE-CORPORAL.

19007	Private ..	Dare, J. R... ..	12.12.10	Special under para. 281, S.O.
19093	,,	Lane, A.	29.12.10	,, ,, ,, ,,

LANCE-SERJEANT.

18240	Corporal ..	Johnson, W. B. T...	1. 1.11	

TRANSFERS FROM OTHER CORPS.

5235	Private ..	Botten, G. H. ..	15.12.10	From Depôt E. Yorks Regt.
5237	,, ..	Wilkie, T.	14.12.10	,, Royal Highlanders.
5238	,, ..	Mercer, J. A. ..	23.12.10	,, L. N. Lancs. Regt.
5239	,, ..	Stow, S. R... ..	15.11.10	,, Rifle Brigade.

TRANSFERS TO OTHER CORPS.

5183	Private ..	Smith, G.	16.12.10	To R. I. Rifles.

EMBARKATIONS FOR ABROAD.

TO SOUTH AFRICA, PER H.T. "ROHILLA," DECEMBER 14, 1910.

9135	S.-Major ..	Senior, E. H. ..	1823	Private ..	Jackson, A. P.
10244	,, ..	Barnard, A. P. ..	1472	,, ..	Ribbons, E. D.
10299	Qmr.-Serjt.	Strong, C. J. ..	1716	,, ..	Duncombe, F. G. W.
11225	,,	Bennett, A... ..	1261	,, ..	Geoghegan, F. E.
10544	S.-Serjt. ..	Granger, T. W. ..	18908	,, ..	Dart, W. H.
12676	Serjeant ..	Young, E. A. ..	1713	,, ..	McCarthy, F. B.
18655	Corporal ..	Shepley, J.	1581	,, ..	Kilby, F. J.
18029	,, ..	Burr, A. L... ..	1505	,, ..	Callis, F. G.
1906	Private ..	Eames, A. T. ..	1835	,, ..	McDowell, A.
1348	,, ..	Abbess, S. G. ..	18978	Corporal ..	Abbott, J. F.

TO SOUTH AFRICA, PER H.T. "SOUDAN," DECEMBER 21, 1910.

9990	S.-Major ..	Wilson, W.	1335	Private ..	Carlisle, A. H.
10221	Qmr.-Serjt.	Larner, E.	1710	,, ..	Hudson, J. H.
10916	Serjeant ..	Carpenter, E. J.	1661	,, ..	Fielding, H. E.
11952	,, ..	Malley, A. E.	1491	,, ..	Harding, G.
13187	,, ..	Sparkes, F.	1522	,, ..	Luttress, E.
15484	,, ..	Jones, C.	1591	,, ..	Ince, J.
18391	,, ..	Turner, E. C.	18221	,, ..	Bradford, G. W.
18432	,, ..	Pearce, G. T.	1818	,, ..	Whitehead, J.
17960	Lce.-Corpl.	McGuire, T.	1889	,, ..	Wilkes, J. T.
1302	Private ..	Jack, J.	1771	,, ..	Leal, T. F.
8843	,, ..	Lowcock, J. A.			

DISEMBARKATIONS FROM ABROAD.

FROM BERMUDA, PER SS. "PORT KINGSTON," DECEMBER 28, 1910.

9245	Qmr.-Serjt.	Cassell, H.	19380	Private ..	Down, C. H.
12058	S.-Serjt. ..	Pettley, A. W.	14603	,, ..	File, C. J.
10084	,, ..	Mulley, F. A.	19641	,, ..	Hardie, W. M.
151	Private ..	Dashfield, G. A. T.	19730	,, ..	Young, T.

FROM GIBRALTAR, PER H.M.S. "TRIUMPH," JANUARY 4, 1911.

9884	Private ..	Corbett, S. M.			

FROM JAMAICA, PER S.S. "THAMES." JANUARY 9, 1911.

7842	S.-Major ..	Kay, C. A.	18353	Private ..	Pollen, A. E.
10108	Serjeant ..	Hinde, W.	19757	,, ..	Rickard, V.
17632	,, ..	Lunn, H. C. A.	144	,, ..	Wood, S. W.
11554	S.-Serjt. ..	Spencer, R.	955	,, ..	McKechnie, R.
17159	Serjeant ..	Jones, C.	664	,, ..	Pronk, C.
16769	Corporal ..	Cole, C. F.	19131	,, ..	Weeks, S. J.
215	Private ..	Iles, S. F.			

DEATHS.

11664	Private ..	Bright, T. W. ..	19.12.10	Acute nephritis, at Aldershot.
19892	,, ..	Fordham, R. ..	29.12.10	Hæmorrhage of brain, at Belfast.
11018	Corporal ..	Lucas, A.	4. 1.11	Pneumonia, at Edinburgh.

THE FOLLOWING N.C.O.'S AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS.

FOR QUARTERMASTER-SERJEANT.

11554	S.-Serjt. ..	Spencer, R.	10206	S.-Serjt. ..	Enwright, J.
12058	,, ..	Pettley, A. W.			

FOR STAFF-SERJEANT.

10950	Serjeant ..	Virgo, H. V.	12495	Serjeant ..	Brewer, T. H.
17973	,, ..	Knott, F.	18415	,, ..	Bell, A.

FOR SERJEANT.

8883	Serjeant ..	Fowler, A.	12187	Corporal ..	Brookes, J. A.
10076	Lce.-Serjt.	Brown, W. H.	12428	,, ..	Ferguson, F. J.
14210	Corporal ..	Fulton, J.	18213	,, ..	Pacey, W. C.
17521	Lce.-Serjt.	Parsons, H. G.	16017	,, ..	Fish, A.

FOR CORPORAL.

198	Private ..	Godsell, A. V.	16132	Private ..	Miller, J. E.

Staff-Serjeant A. E. Lane re-embarked for Northern Nigeria on January 4, 1911, for a further tour.

NOTES FROM ALDERSHOT.- Serjeant-Major Roberts writes:--

FOOTBALL.

"The Corps team has not played any game of interest lately, League football in Aldershot just now being in a moribund condition.

"A very enjoyable game was recently played between the officers and serjeants of the Corps here, victory resting with the former by 4 goals to 1. The energy and resource shown by the Officers was too much for the N.C.O.'s, who were easily repelled by the officer's goalkeeper on the few occasions they visited his citadel. Captain Greenwood and Lieutenants Johnson and Simpson for the officers, and Serjeant Stokes for the serjeants, displayed excellent form.

HARWOOD CHALLENGE CUP COMPETITION.

"*Semi-final.*—No. 2 Company *v.* No. 20 Company; result 8—0 in favour of former. This match was played on the Corps ground on December 22, a fast and keenly-contested game resulted. No. 2, playing with commendable dash, were soon attacking

and many times were only kept out by the resourcefulness of No. 20 goalkeeper, No. 2's account should, however, have been opened a few minutes from the start, as Griffiths, beating the defence, had only the goalkeeper to vanquish, but shot weakly into his hands. No. 20 played with rare pluck after this, keeping their opponents well on the stretch. The first point came after twenty minutes play, a good movement culminating in Ellis shooting a fine goal; this was the position at the interval. On resuming, fine form was shown by both teams, spectators being delighted at the vim, force, and methods shown. By strenuous tackling and quicker footwork, No. 2 assumed the upper hand, Wylie scoring with a magnificent shot, although hampered by the backs. Another point came from the same player some fifteen minutes from time, the effort being a fine one, the goalkeeper having no chance. From this on there was no doubt of the ultimate result. No. 2 Company now meet No. 10 at Chatham in the Final.

"The teams were: No. 2 Company, Private Turnbull (goal); Privates Roberts and Gardiner (backs); Privates Walkley, Stanton, and Harrison (half backs); Privates Wilson, Ellis, Wylie, Griffiths and Lance-Corporal Haigh (forwards).

"No. 20 Company: Private Andrews (goal); Serjeant Boxshall and Private Wilkins (backs): Privates Goodrich, Boxall and Corporal Stroud (half backs); Privates Cox, Palmer, Howarth, Hutchinson and Dent (forwards).

"CHRISTMAS FESTIVITIES.

"*The Cambridge Hospital.*

"The large dining hall was lavishly decorated and festooned, and here such patients as were not restricted in their diet sat down to a very substantial Christmas dinner, their wants being attended to by the nursing sisters and the company attached to the hospital. The meals were admirably prepared by the staff of cooks, under the able direction of Serjeant-Cook Glenn.

"The convalescent patients in the Cambridge Hospital were entertained on Friday afternoon to a delightful concert arranged by Lady Gallwey. The concert was held in the Patients' Library, which was prettily decorated for the occasion. All who could possibly leave their wards were present, and they thoroughly enjoyed the many good items that filled the programme. Serjeant Dixon's fine voice was heard to advantage in his rendering of 'Thora,' and Mrs. Connolly sang 'A Dream of Paradise,' so well that she was enthusiastically encored, rendering equally well 'Whisper and I shall Hear.' Mrs. Lommer gave two splendid violin solos, which were much appreciated, and Corporal Morfitt sang in fine form 'Roses.' Lieutenant Rawson, Royal Engineers, contributed 'The Little Tin Gee-Gee,' and in response to the encore he received gave a spirited rendering of 'Yip-i-addy,' which proved very much to the taste of the audience. Corporal Stafford continued the humorous element by his laughable rendering of 'I want to Sing in Opera,' appearing in a hobble skirt that caused roars of laughter. Later he was associated with Corporal Cairns in a comic duet, 'Alice.' Quartermaster-Serjeant Taylor sang very nicely 'Marguerite,' and then Lieutenant J. T. Simson played a rousing solo on the bagpipes, the feet of the audience moving in rhythm with the music. Miss D. A. Scott was applauded for her rendering of the song 'A Tiny Seed of Love,' and Bandsman Davies, 4th Middlesex Regiment, followed with two most laughable comic songs, well rendered. Conductor Davis, Army Ordnance Corps, delighted the audience with his humorous song 'Married and Courting,' and in response to an encore sang 'Rings on my Fingers.' A word of gratitude is due to Colonel Treherne, who, at a moment's notice, consented to act as accompanist. Private Staden accompanied with the violin.

"*The Connaught Hospital.*

"The patients in the Connaught Hospital were not forgotten during the festive season. Christmas Day was passed quietly; during the afternoon carol singers visited the bright wards. In the evening a nice tea was provided by the thoughtful nursing staff, after which the Rev. Basil Stothert displayed some sacred picture slides by means of his magic lantern. On Monday the usual fare of the patients was supplemented by suitable additions, and right royally the 140 patients who sat down to the festive board enjoyed themselves. It did one good to watch the nursing sisters in their bright capes going ceaselessly about at work promoting the happiness of the guests.

"In the evening an excellent concert was provided, amongst those present being: Lady Gallwey, General and Mrs. Scott-Moncrieff, Major and Mrs. Guise Moores, Colonel and Mrs. Rowan, Colonel Carlyon and Miss Carlyon, Mrs. Gaussen and daughters, Miss Paget, the Misses Chubb, and Miss Reid. Mr. Harry Saunders, of

Aldershot, Messrs. Charlie Denton, Harry Newton, George Skinner, and Miss Royal, of London, contributed to the entertainment, each being recalled several times by their enthusiastic audience; other items were given by Driver Elder, Royal Field Artillery; Private Trott, 19th Hussars; Private Murray, 2nd Border Regiment; and Private Sabin, 1st Leicester Regiment. During the day and evening much fun was caused by the antics of a huge Teddy Bear, the costume being perfect.

"No. 2 Company, R.A.M.C., Connaught Hospital, participated in the general feeling of joyousness with which Christmas is associated, the usual liberal menu, too extensive to mention, being provided. As at most places, the orthodox Christmas scheme was reserved for Monday. The men, having transformed the barrack rooms for the time being, dined at 5 p.m. Having done so wisely and well the remainder of the day was spent in dancing interspersed with vocal efforts from good performers. The married people of the Company and many other guests were invited. Most of the Officers, together with the Matron (Miss I. G. Willets) and Nursing Sisters, visited the scene of enjoyment, and stayed there some time. The function terminated about 11.30 p.m., after what had been a very merry evening.

"The serjeants' mess childrens' Christmas party took place in the corps training school from 6 p.m. to 10 p.m. on December 27. The building was tastefully decorated. Tables were strewn with an assortment of fruit, sweets, cake, crackers and other delicacies dear to the hearts of children. The vocal and instrumental items were in the hands of Corporal Stafford, Corporal Cairns, Private Thomas, Bandsmen Large and Staden; the first three named were responsible for a farce entitled 'A Servant Wanted,' conjuring of a laughable nature. Fixing the donkey's tail caused roars of laughter. Serjeant J. E. Partridge carried out the impersonation of Santa Claus very well indeed. Games such as 'Kiss in the Ring,' 'Gathering Nuts and May,' were indulged in.

"The adults were not forgotten, a bar having been erected at the end of the room in which refreshments were served. When the majority of the children had departed dancing was indulged in by the adults until 11 p.m.

"The following committee was responsible for this entertainment: President: Quartermaster-Serjeant Connolly; Members: Quartermaster-Serjeant Hook, Staff-Serjeant Merchant, Serjeant Muirhead, Glenn, Partridge, Bowen, and Reggie. They are to be congratulated on the success of their efforts.

"SERJEANT'S NEW YEAR SOCIAL.

"The members of the serjeants' mess held their customary New Year 'At Home' on Monday evening in the Corps' Training School, and the social event proved undoubtedly the most successful affair of its kind ever held in the Corps. Well over three hundred members and their friends were present in the gaily-decorated hall, among the guests being a large number of the officers of the Corps, Lieutenant-Colonel G. D. Hunter, D.S.O., and Mrs. Hunter, Major S. F. Green and Mrs. Green, Major N. H. Ross and Mrs. Ross, Captains J. W. Langstaff, J. S. Bostock, F. S. Irvine, and L. Cotterill, Lieutenants F. R. Laing and J. T. Simson, and many other officers being among those present.

"Dances, set and round, songs, sentimental and comic, and instrumental solos were sandwiched between each other, keeping the fun and interest at top pitch from start to finish, the National Anthem sung about 3 a.m. bringing to a close a very jolly time.

"At midnight there was silence, and from afar the skirling of bagpipes was heard. The music came nearer, ascended the stairs, and there entered the room in single file, Captain Cotterell and Lieutenant Simson playing the pipes, and Serjeant Bugler 'Little Dick Smith' with a drum. They paraded the room playing a rousing pipe march, which changed into a lively strathspey, setting all the feet in the room jigging. Then the air changed into a reel, and Lieutenant Armstrong danced a solo reel, to the great delight of the company.

"Quartermaster and Honorary Captain G. A. Benson, R.A.M.C., was posted to the Cambridge Hospital for duty on arrival from abroad, but the order has now been cancelled, as it is understood that this officer is retiring.

"Quartermaster and Honorary Captain F. W. Hall, R.A.M.C., embarked for South Africa, December 21, 1910.

"No. 16022 Corporal J. J. Dawson, R.A.M.C., has been appointed Clerk at the Army Medical Stores, Woolwich. No. 2 Company will greatly miss their indefatigable Honorary Secretary of the Recreation Club, to whom they are much indebted for his untiring efforts to promote sport during the four years he has been at the Connaught Hospital.

"No. 7594 Serjeant G. W. Palmer, R.A.M.C., has been successful in obtaining the appointment of Chef to the Duke of York's School at Dover; the post is a lucrative one.

"Serjeant Palmer leaves Aldershot on the completion of twenty-four and a half years' service with the good wishes of all. He was a smart, clean, and model member of the Corps and a pattern for young N.C.O.'s to copy. As a mark of appreciation he was presented by his comrades at Aldershot with a splendid souvenir in the shape of a pair of 'Bronze Marli Horses,' mounted on marble bases, with a suitable inscription.

"Serjeant Muirhead and a Private, Royal Army Medical Corps, have been selected to proceed to London to give evidence before the Special Commission sitting at the War Office to inquire into the scale of soldiers' pensions.

"HARWOOD CHALLENGE CUP COMPETITION, 1910-11—No. 2 COMPANY, WINNERS.



Back row—19765 Private E. Stanton, 4919 Private T. Roberts, 1911 Private N. Turnbull, 2236 Private G. Walkley, and 4331 Private J. Gardiner.
Centre row, right to left—1810 Private R. E. Griffiths (Captain), Lieutenant MacArthur, Lieutenant-Colonel H. M. Sloggett, Serjeant-Major G. H. Roberts, and 18988 Lance-Corporal R. H. Haigh.
Third row, right to left.—4412 Private J. Wilson, 4698 Private P. Ellis, 4519 Private E. Wylie, and 4595 Private J. Harrison.

"HARWOOD CUP FINAL.

"This tie was played against No. 10 Company at Chatham on the 11th inst, victory resting with No. 2 Company by 2 goals to 1. Good football was out of the question; the weather militated against its exposition, a regular gale sweeping the ground from goal to goal. In spite of this, however, the game was brimful of incidents. No. 10 Company, winning the toss, decided to kick against the wind. After being penned in their own lines for twenty minutes, a miss-kick by the right half was snapped by Rudd, who, finding No. 2's defence undecided, went on and easily beat Turnbull. Naturally the scorer was heartily congratulated by his *confrères*. Hereabouts No. 2 failed to

cope with the peculiar saucer-like shaped ground and terrific wind, but just on half-time Haigh scored for No. 2 with an excellent shot.

"On resuming, No. 10 soon showed their knowledge of the ground by plying the left wing, but failed to add to their total. No. 2's passing against the wind was favourably commented upon. Although many exciting incidents occurred, time arrived with the score 1 all. An extra half hour had to be played. No. 2 kicking off against the wind, after five minutes' play Wilson broke through and scored for No. 2 Company, and thus for the first time in the history of the Cup it goes to No. 2 Company. The writer would like to echo the sentiments of No. 2 Company by referring to the kind hospitality of No. 10 Company on this occasion. It was splendid; they not only proved worthy foes, but friends.

"The following friendly games were recently played by the Corps team;—

"*Versus* Portsmouth Reserves, 6 to 4 against. Scorers for us: Phillips (2), Prince (1), Gillham (1). *Versus* Oxford City, 2 to 0 against.

"Acting Serjeant-Majors Cotter, Raven and Leaf, from Birmingham, and West, from Stony-Stratford, of the Permanent Staff, Territorial Force, are undergoing a 'Refresher's Course' here of one month's duration."

NOTES FROM WOOLWICH.—Serjeant-Major Green writes: Our Christmas week was one full of entertainment, and proved thoroughly enjoyable both to patients and the staff.

"*Patient's Christmas Dinner.*—An excellent spread of the season's delicacies was provided for the patients. The large dining hall was most tastefully decorated under the superintendence of the Matron (Miss M. Russell, R.R.C.) and Sisters. The patients were unanimous in praise of the arrangements made for their benefit. Lieutenant-Colonel R. J. S. Simpson, C.M.G., and Lieutenant-Colonel J. B. Wilson with other officers visited the dining hall and wished the men the Seasons' compliments.

"*Company Christmas Dinner.*—The Company's Christmas dinner to which about ninety sat down was a complete success. Nothing better could have been desired than the fare provided. As Christmas Day fell on a Sunday, it was arranged that the dinner should take place on Boxing Day instead, and so permit of the usual entertainment afterwards, which is an annual institution in Woolwich, and one to which the men look forward. The Committee members were all energetic, and Corporals Hearn, Heggie, Cairns, Royals, Luscombe (Hans), and Privates Welch, Walsh, Steedman, and Fowell deserve great credit. A series of six large cartoons on 'How Tommy spends his Christmas Day,' were both highly humorous and very clever. They were drawn by Private Welch, and were displayed on the walls of the Company's dining hall.

"*Patient's Entertainments.*—A tea was given to the patients on Boxing Day by the Matron and Sisters, followed by an impromptu concert at which quite a good supply of talent was discovered amongst the Staff and patients. This was highly appreciated by those who were in hospital.

"A concert was also arranged on December 29, in the patients theatre of which the following is the programme:

"PROGRAMME.

Pianoforte Introduction	'La Lucretia' (*Valentine*) ('*The party introduce themselves*)	Master CYRIL GREEN.
Humorous Song	'Games'	Mr. OSBORN MORGAN.
Song at Piano	'Darkies' Love'	Madame EDITH KELLETT.
Song	'The Deathless Army'	Mr. JAMES PAUL.
Piano Sketch	'Water Scenes'	Mr. HARRY JEFFEREY.
Duet	'A May Morning'	Madame KELLETT and Miss LILIAN GARWOOD.
Humorous Song	'Sophy's Sweethearts'	Mr. OSBORN MORGAN.
Song	'Lighterman Tom'	Mr. JAMES PAUL.
Song at Piano	'Hullo Martha!'	Miss LILIAN GARWOOD.
Chorus Song	'Coming down the River'	THE PARTY.
Piano Sketch	'Our Wedding'	Mr. HARRY JEFFEREY.
Humorous Song	'German Band' (by request)	Mr. OSBORN MORGAN.
Song	'Angus Macdonald'	Madame EDITH KELLETT.
Humorous Duet	'Then and Now'	Miss GARWOOD and Mr. JEFFEREY.
Quartette	'You stole my Love'	THE PARTY.

'GOD SAVE THE KING.'

"The artists were most enthusiastically received and numerous encores were demanded.

"*Married Families Entertainment and Christmas Tree.*—On December 28, the families of the married Warrant Officer's, N.C.O.'s and men collected in force for the tea and entertainment annually arranged by the officers and their wives. The tea tables were absolutely full of delicacies. In the centre of one table at which some fifty children were seated was an immense Christmas cake, which subsequently disappeared amongst a happy and chattering little crowd. Tea being over, the party trooped off to another room where games, dancing, &c., occupied about an hour. Then came the children's time, when the loaded Christmas Tree was brought to view, and many little 'Ohs!' were heard. Father Christmas (in the form of Captain and Quartermaster Talbot) then, with the assistance of the ladies, commenced a distribution of the handsome presents and toys. An improvised Post Office caused a lot of amusement. As the wives and children had previously had the opportunity of naming the presents most desired, there was every satisfaction when the looked-for articles came passing along.

"The entertainment had been most generously subscribed to. Especial thanks are certainly due to the ladies' committee, for the indefatigable way in which they worked towards such an all-round highly successful function. Bon-bons, fruits and sweets were distributed to each child before leaving. The thanks of the recipients were conveyed to the Committee who organised the entertainment for their great kindness and trouble.

"*Serjeants' Mess Soiree.*—Our Annual New Year's *Soiree* was held on December 20, when quite a brilliant gathering assembled for the occasion. In all we had about 120 guests, and a most pleasant party resulted. Our dance programme was interspersed with some good vocal talent, programme as follows:—

"PROGRAMME.

Overture	'Hobomoko'	
	'PART I.	
Waltz	'Mountaineers'	
Lancers	'Girl in the Train'	
Song	'Games'	Mr. OSBORNE MORGAN.
Schottische	'Selected'	
Veleta	'The Mascot'	
Song	'Fair Land of Kent'	Mr. JAMES PAUL.
Quadrilles	'Italian Campaign'	
Waltz	'Jum Charmant'	
Song	'Water Scenes'	Mr. HARRY JEFFEREY.
Two Step	'Blarney Stone'	
Song	'Jammy Face'	Miss LILIAN GARWOOD.
Veleta	Original	
Song	'Sophy's Sweethearts'	Mr. OSBORNE MORGAN.
Lancers	'Waltz Dream'	
Waltz	'Ravissante'	
Duet	'The Jovial Blacksmiths'	
	Interval fifteen minutes.	
	'PART II.	
Waltz	'Love's Song'	
Lancers	'White City'	
Song	'Aschoo'	Mr. OSBORNE MORGAN.
Schottische	'Linckes'	
Veleta	Original	
Song	'Bachelor's Love Song'	Mr. JAMES PAUL.
Quadrilles	'Royal Irish'	
Der Styrien		
Song	'Hullo, Martha!'	Miss LILIAN GARWOOD.
Waltz	'Septembre'	
Two Step	'Le Militaire'	
Song	'Our Wedding'	Mr. HARRY JEFFEREY.
Lancers	'A Nicht wi' Burns'	
Song	'Kisses and Kisses'	Mr. JAMES PAUL.
Veleta		
Sir Roger de Coverley		

'GOD SAVE THE KING.'

'*Accompanists* (*Vocal*)—Mr. JEFFEREY and Miss GARWOOD.'
'(*Dance*)—Messrs. SOMERS.'"

"Our spacious mess lends itself to entertainment of this kind, especially when we are favoured by the officers with the loan of their library adjoining. Serjeants Thompson and Buckner were responsible for the decorations, and merit our thanks for their energy and taste in the matter.

"*Annual Company Smoking Concert.*—This concert was, as usual, held on New Year's Eve, and though there was not quite so many present as there was on the past two or three occasions, we had a most enjoyable time. We had a programme of thirty turns. The toasts proposed during the evening were 'The King' 'Our Officers' (responded to by Major Jones the Commanding Officer, and Lieutenant and Quartermaster Clark), 'Absent Comrades,' 'Our Guests,' and 'The Committee.' They were all received in a most hearty manner. On the last sound of twelve the Company (officers and men) joined hands in silence, while the old reveille was blown by our buglers, after which 'Auld Lang Syne' was sung with real good feeling, and we dispersed to commence 1911, with, I suppose, varying resolutions."

NOTES FROM COSHAM.—Staff-Serjeant Ulph writes: "On December 26, when the headquarters of No. 6 Company, Royal Army Medical Corps, were seated to attack the usual Christmas fare, the Commanding Officer, Lieutenant-Colonel C. W. Johnson, (acting for Lieutenant-Colonel R. E. R. Morse, on leave pending retirement), accompanied by the Company Officer, Major L. Way, and other officers, drank the health of the Company, and wished them the compliments of the season, and hoped that they would have a jolly time. The toast was heartily responded to by the N.C.O.'s and men.

"The dinner was followed by a fancy dress football match, the leading spirits of which were Privates Dale, Hahner, O. B. Turner, Hall, Emerson, and Turnbull (referee). A pleasant evening, spent in mirth, music, and song, closed the day.

"On Christmas Day, with the financial assistance of the several Commanding Officers in garrison, the patients in hospital were entertained with special fare of turkey, ham, plum-pudding, mince-pies, fruit, and nuts, also tobacco and cigarettes. On the following day a gala tea was served.

"On January 3, by the kindness of our Chaplain—Rev. F. G. Wright—the choir of the Garrison Church, Hilsea, visited the hospital and entertained the patients with Christmas carols.

"On January 4, by the kind permission of the Commanding Officer, a concert was arranged by the Matron, Miss M. Wilson, for the benefit of the patients, at which the following programme was rendered, and every item brought forth great applause. The performance of the farce entitled "Time is Money" was excellent, and being interesting and amusing was well received.

"PROGRAMME.

Song	'Dream O'Day Jill'	Miss LISTON.
Song	'Like Stars Above'	Mr. WALTER REYNOLDS.
Song	'Beautiful Garden of Roses'	Mrs. MORETON.
Recitation	Selected	Mrs. DU-BOULAY.
Song	'Grey Eyes'	Mr. GRANVILLE.
Song	'She is far from the Land'	Miss ROE.

A Farce entitled :—

"'TIME IS MONEY'

"*Characters :*

Charles Graham	Captain ADDISON.
Susan	Mrs. MONEY.
Mrs. Murray	Miss SPENCER.

'GOD SAVE THE KING.'

"On January 5 the headquarters of No. 6 Company, Royal Army Medical Corps, paraded for the presentation of medals for long service and good conduct to No. 9579 Serjeant-Major C. F. Houston, 9632 Staff-Serjeant J. Baxter, and 9535 Private T. Osborne, by the Officer Commanding Royal Army Medical Corps, Portsmouth District. Colonel H. Hathaway heartily congratulated the recipients, and expressed his pleasure of being able to present so many at one time. It may be noted here that No. 9697 Quartermaster-Serjeant C. W. France missed this presentation by three days, having earned his medal on July 4. Colonel Hathaway also took advantage of the parade to

congratulate the winners of the Military Hospitals Cookery Challenge Shield, and to present the medals and diplomas as follows :—

"5783 Serjeant H. Hawkins, in charge of team, silver medal.
"18907 Private W. J. Blundell, silver medal, diploma, and 10s.
"18675 Private A. C. Partridge, bronze medal and diploma.

"Private Blundell also received a special prize of a silver medal for his invalid tray in the individual competition.

"Both Private Blundell and Private Partridge have won bronze medals in the Challenge Shield competition in former years.

"On January 6, by the kindness of Colonel and Mrs. Hathaway, and officers of the Royal Army Medical Corps, the Royal Army Medical Corps children, about forty-five in number, in the Cosham, Hilsea, Portsmouth, and Gosport area, and their parents, were entertained at tea, and afterwards to an excellent conjuring performance and Christmas tree. The event, thanks to the efforts of Mrs. Hathaway, was very successful, and highly appreciated by all—adults as well as juveniles.

"*Movements.*—Lieutenant L. K. Way joined from Aldershot, January 3. Captain J. H. Gatt embarked for Karachi on the Transport 'Rewa,' January 5. Major J. F. W. Porter joined from London, January 8. Captain W. J. P. Adye-Curran proceeded on leave from January 9 to March 10. Lieutenant F. H. Somer Gardner proceeded on leave from January 4 to January 21. Sister M. L. Kaberry proceeded to the Cambridge Hospital, Aldershot, on January 10, on promotion. 12896 Private E. Blennerhassett, Cosham to Reading, January 7. 4880 Private S. D. Harris, Cosham to Weymouth, January 7. 1951 Private F. J. R. Money, Cosham to Weymouth, January 9."

NOTES FROM DEVONPORT.—Lieutenant and Quartermaster C. W. Kinsella, R.A.M.C., writes: "On December 21, the annual Christmas treat to the married families of No. 7 Company, Royal Army Medical Corps, was held at the Military Hospital, Devonport. In a handsomely decorated hall some forty families sat down to high tea, the officer's wives, with Miss Payne and the Sisters, being assiduous in attending to the wants of their guests. After tea, to the huge delight of the juveniles, an imposing Christmas tree, laden with toys and useful presents, was unveiled, and Santa Claus (impersonated by Serjeant Burden, R.A.M.C.) made the youngsters happy by a distribution of toys, gifts, &c., suitable to the recipients.

"A sleight-of-hand and Punch and Judy show terminated a pleasant evening, the youngsters' sentiments (on the call of Serjeant-Major Ward) being voiced by three hearty cheers for the officers and their wives. The latter, headed by Mrs. Tyacke, are to be congratulated on the results of their efforts, the dressing alone of the numerous dolls showing infinite care and skill.

"Colonel Jennings, A.M.O., with Mrs. Jennings, Lieutenant-Colonel Kirkpatrick, Officer Commanding, the officers and their wives, Matrons and Sisters, with the Chaplains, and some lady friends, were present throughout the evening.

"On Christmas Day the patients partook of a special dinner in their dining-hall (which had been tastefully decorated by Miss Payne and the Sisters), and were visited, (in the absence on leave of the Officer Commanding), by Major Tyacke who tendered them seasonable good wishes.

"The Company were also visited in their handsomely decorated recreation room, where a Committee, presided over by Serjeant Burden, had provided sumptuous fare for the inner man, and here the toast of "The Officers," proposed in a brief but appropriate manner by Serjeant-Major Ward was received with musical honours, Major Tyacke and Major O'Flaherty (Company Officer) responding.

"The Serjeants' Mess was also visited and seasonable greetings exchanged.

"On Boxing Day the Company held a Smoking Concert, with Serjeant-Major Ward in the chair.

"On the 27th the patients were treated to a high tea followed by a concert."

NOTES FROM DEPOT, ALDERSHOT.—Major N. H. Ross, R.A.M.C., writes: "A highly-successful concert was held at the School of Instruction, Depot, Aldershot, on November 29, 1910, in aid of the Incorporated Soldiers' and Sailors' Help Society, which has done such splendid work in giving assistance to the N.C.O.'s and men of the Royal Army Medical Corps. At the time of commencement the large room was packed, and from start to finish the proceedings went with a swing. The following was the programme, and glancing at it one can see the high character of the performance :—

"PROGRAMME.

"PART I.

Overture	'Loin du Pays'	R.A.M.C. BAND.
Song (Comic)	'I'm here if I'm wanted.'	Cpl. CAIRNS.
Song	'The voice in the Cathedral'	Qmr.-Serjt. TAYLOR.
Comic	'Truly Rural'	Lce.-Cpl. STAFFORD.
Song	'Rose of my Life'	Serjt. DIXON.
Song (Comic)	'Wallah Wallatt'	Bandsman DAVIS.
Selection	'Popular Songs'	R.A.M.C. BAND.
Recitation	'By order of the Czar'	Staff-Serjt. WATT.
Violin Solo	'Broken Melody'	Pt. STADEN.

Cpl. CAIRNS and Lce.-Cpl. STAFFORD in their amusing 'Do et' 'Prof. Bilboa'

"*Interval*

"PART II.

	'Valse Septembre'	R.A.M.C. BAND.
Pipes	'Selection'	Capt. COTTRILL and Lt. SIMPSON.
Song (Comic)	'Pipelights'	Cpl. CAIRNS.
Song	'Dear Heart'	Serjt. DIXON.
Song (Comic)	'Can London do without me?'	Lce.-Cpl. STAFFORD.
Flute Solo	'L'Oiseau d' Oby Young'	Lce.-Cpl. BORELAND.
Song	'Out on the Deep'	Serjt. NEWMAN.
Song (Comic)	'Listen to me'	Bandsman DAVIS.

Bandsman CHEESMAN, Society Entertainer.

"GOD SAVE THE KING.'

"The Royal Army Medical Corps Band played its three selections as only the Royal Army Medical Corps Band can.

"Corporal Cairns, Lance-Corporal Stafford and Bandsman Davis, 4th Middlesex Regiment, kept the audience in fits of laughter, the latter being inimitable in his impersonation of Sam Mayo. Serjeant Dixon and Quartermaster-Serjeant Taylor well deserved the encores they received. Captain Cotterill and Lieutenant Simpson roused the enthusiasm of the Scotch members of the audience with their selections on the pipes. Private Staden, violin solo, and Lance-Corporal Boreland, flute solo, received encores, but the length of programme prevented them performing again. Bandsman Cheesman, the Society entertainer, with his mobile features and impersonations, brought the concert to an end.

"The Concert Committee: Serjeant-Major Woollard, Staff-Serjeants Merchant, Williams, and Maxwell are entitled to much praise for the way the concert was materialised and carried out.

"After deducting a few minor expenses, a balance of £14 8s. was sent to the Society."

NOTES FROM FORT PITT, CHATHAM.—Serjeant-Major H. J. Ford writes: "The Christmas arrangements of the Military Hospital and No. 10 Company, Royal Army Medical Corps, were very successful. The decorating of the patients' dining-hall and tables exhibited much taste on the part of those responsible for them. Flags, coloured festoons and the usual appropriate mottoes covered the walls. A first-class Christmas dinner was provided, and those who were unable to attend the dining-hall were not forgotten, as they had their Christmas dinner in the wards. After the patients had had their dinner the men of No. 10 Company sat down to their own Christmas fare in No. 1 barrack-room, this room being also suitably decorated for the occasion. Major Carter (the Company Officer) and Lieutenant Bevis visited the room and drank the health of the Company, and after a few very appropriate remarks left the men to enjoy themselves. From there these officers proceeded to the N.C.O.'s mess and drank to the health of its members.

"A sacred concert was held in the evening in No. 11 ward, in which some excellent solos, Christmas carols, &c., were sung in first-class style. On Monday, December 26, another excellent impromptu concert was held in the evening in the same ward.

"On Thursday, December 29, the members of the Q.A.I.M.N.S. entertained the patients at tea in No. 4 ward, after which an excellent concert took place in No. 7 ward, given by Staff Nurse Barrow, Q.A.I.M.N.S.

"On Friday, December 30, a first-class tea was provided for the patients in No. 4 ward. Simultaneously, a Christmas tea was given to the wives and families of No. 10

Company in the patients' dining-hall. The tea was followed by a Christmas tree which was loaded with toys, &c., to the great delight of the children who were present. The tree was very prettily decorated by Mrs. Harvey (wife of Captain Harvey, R.A.M.C.). After the distribution of toys had been made, a cinematograph and gramophone entertainment took place in No. 2 ward, to which everyone was invited, including the patients, and which was thoroughly enjoyed by all present. This brought the Christmas festivities at Fort Pitt to an end."

Quartermaster-Serjeant Audus writes:—

"*Football.*—The Company entered a team for the 'Harwood' Cup Competition, and were fortunate enough to have a bye in the first round. In the second round the team journeyed to Woolwich and played No. 12 Company on November 23, and after a hard and fast game, played in heavy rain, No. 10 Company were the victors by 3 goals to 1. In the semi-final we were drawn to play No. 11 Company, and this match took place at Chatham on December 7. The Dover team played an excellent game, and at half-time were leading by 2 goals to 1, but in the second half the Chatham team turned the tables and gained a well-earned victory by 4 goals to 3, and were thus enabled for the first time to take part in the 'final' This took place at Chatham on January 11, our opponents being No. 2 Company, Aldershot, and as we had to acknowledge defeat to them by 2 goals to 1, after playing extra time, I have no doubt that a more detailed account of the match will be forwarded to the 'Corps News' by their correspondent. The cup and medals were presented at the close of the match to the winners by Major A. Pearse, R.A.M.C. We regret that we are not able to retain the 'Cup' at Chatham, but have the satisfaction of knowing that it has for once been brought here. We give our hearty congratulations to the victors (No. 2 Company), and hope for better luck in the competition next year.

"The following are the players in No. 10 Company team, all of whom took part in each match played: Lieutenants Bevis and Davies, Serjeant Catley, Privates Abnett, Cannon, Young, Ellard, Ellis, Rudd, Cartledge, and Dean.

"After the final match had ended, both teams and their officials, together with the N.C.O.'s and men of No. 10 Company, also a good number of visitors from Woolwich, Maidstone, &c., sat down to a meat tea which had been provided for them in the Company recreation room, and after having full justice done to it, was followed by a smoking concert at which several officers of both Companies were present. After some songs had been rendered, the toast of the 'Winning Team' was proposed by Lieutenant Bevis, R.A.M.C. (Captain of the 'losing' team) and their health drunk with musical honours. Serjeant-Major Roberts suitably responded for the team of No. 2 Company and called upon them to drink to the health of No. 10 Company, which was carried out by them with great enthusiasm. Some more songs and the toast of 'The Visitors' was then proposed by the Chairman (Serjeant-Major Ford), which was responded to by Corporal Hearn, Secretary of No. 12 Company Football Club, who in a few well-chosen remarks stated that he and others had come down to witness the final for the Cup, and although rather disappointed that it had not found a resting-place for a year in one of the Companies in the Eastern Command, they had all witnessed a well and hard-fought game, and gave all due credit to the victorious side on gaining the trophy. As the team and officials of No. 2 Company had to catch an early train back to Aldershot, the first portion of the concert was then brought to a conclusion. Serjeant-Major Roberts thanked No. 10 Company for the excellent way in which they had been entertained, and after the customary greetings and farewells had been made, left with the 'Cup' for the Connaught Hospital, where I have no doubt they were well received on arrival.

"After a short interval, the concert was continued, and after an enjoyable time, although the Cup had left us again, we were all a merry party, and at 8.30 p.m. 'The King' was sung and the day's proceedings brought to a conclusion.

"CHATHAM, JANUARY 11, 1911.

"PROGRAMME.

Overture	'Selected'	Cpl. COLLINS.
Song	'Dandy Dan'	Pte. GRIFFITHS, No. 2 Coy.
Song	'The Veteran's Song'	Lieut. DAVIES.
Recitation	'In Arduis Fidelis'	Qmr.-Serjt. AUDUS.
Toast	'The Winning Team'	Lieut. BEVIS.
Song	'Good Company'	Serjt.-Major ROBERTS, No. 2 Coy.
Song	'Redwing'	Cpl. SPARKES, No. 3 Coy.

Song	'I put on my coat and went home'	Pte. FRANKLIN.
Toast	'The "Losing" Team'	Serjt.-Major ROBERTS, No.2 Coy.
Song	'The Galloping Major'	Serjt. HUGHES.
Toast	'The Visitors'	Serjt.-Major FORD.
Song	'The Cockney Scotchman'	Serjt. CATLEY.
Song	'Ding Dong'	Pte. FRANKLIN.

"*Interval.*

Song	'The Old Bassoon'	Qmr.-Serjt. WILLIAMS (late A.P.C.)
Song	'Honeysuckle and the Bee' (Parody)	Pte. DEAN.
Song	'Pink Pickaninny'	Qmr.-Serjt. AUDUS.
Song	'Only to see her Face'	Pte. YORK.
Song	'The Last Roll Call'	Cpl. NICHOLAS.
'Cello Solo	'Selected'	Col.-Serjt. PARNELL, R.M.L.I.
	Encore—'Eileen Allanah'	
Song	'In Marble Halls'	Serjt. WILKINSON.
Recitation	'The man with the single hair'	Qmr.-Serjt. WILLIAMS (late A.P.C.).
Song	'Senorita' (Parody)	Pte. SMITH.
Song	'Poor thing'	Col.-Serjt. PARNELL, R.M.L.I.
Song	'Weary'	Pte. SPINK.

"GOD SAVE THE KING.'"

NOTES FROM YORK.—Lieutenant-Colonel Newland writes, under date January 9, 1911:—

"CHRISTMAS FESTIVITIES AT THE MILITARY HOSPITAL, YORK.

"The patient's Annual Tea and Concert was held on December 22, and was a great success; the following musical programme will speak for itself:—

"PROGRAMME.

"PART I.

March	'The Bullfighters'	THE BAND.
Selection of Pellisier's Songs as produced by the 'Follies'		THE BAND.
Song	'Take a Pair of Sparkling Eyes'	Cpl. HORNSBY.
Comic Song	'You don't want to keep on showing it'	Tpr. GODFREY.
Monologue	'The Labour Leader'	Mr. FRANCIS.
Duet (Selected)		Messrs. REG. JACKSON and LESLIE WILLIAMS.
Song (Selected)		Major ERSKINE, R.A.C.M.
Humorous Vocal Quartet	'Jack Spratt'	Messrs. DUNLOP, VERNON. Cpl. HORNSBY, and MORGAN.
Song	'The Drum Major'	Musician WHEELHOUSE.
Grand Selection from 'Faust'		THE BAND.

"PART II.

Alaskan Love Song	'Cocheco'	THE BAND.
Duet	'What, What'	Messrs. R. JACKSON and L. WILLIAMS.
Monologue	'A Soliloquy of an Old Shoe'	Mr. FRANCIS.
Valse	'Der Graf von Luxemberg'	THE BAND.
Duet	'Half-past Two'	Sister HUMPHREYS, Q.A.I.M.N.S., and Major ERSKINE, R.A.M.C.
Song and Dance	'The Pearl of Peru'	Pte. PATERSON.
Song	'The Veteran'	Cpl. HORNSBY.
Comic Song	'We've all been doing a bit'	Tpr. GODFREY.
Humorous Quartet	'Call John'	Messrs. DUNLOP, VERNON, Cpl. HORNSBY, and MORGAN.
Selection from the 'Chocolate Soldier'		THE BAND.

'GOD SAVE THE KING.'

"Matron S. L. Wilshaw and the Sisters worked very hard, and I am sure the successful results of their efforts more than rewarded them for their good work.

"The String Band of the Royal Scots Greys, under Mr. Frayling, carried out the instrumental portion of the programme in a highly-efficient manner.

"Lieutenant-Colonel W. Turner was unavoidably absent at the finish, and Major W. D. Erskine in a few well-chosen words thanked all who had helped to carry out such a successful entertainment.

"No. 8 Company had their usual Christmas Dinner on the 25th. The Mess-room was most tastefully decorated. Major W. D. Erskine, on behalf of the Commanding Officer, visited and gave a cheery little speech to the men, thanking them for past services and hoping they would all have a good time.

"On December 29, The Annual Smoking Concert took place and all had a real good time; the talent was so exceptionally good all round that it is extremely difficult to single out anyone for special comment.

"Majors W. D. Erskine and C. C. Spencer and Captain A. H. Hayes were present, the first named rendering his numbers in really fine style.

"In a little speech Major W. D. Erskine reviewed the work of the year and thanked the Warrant Officer, Non-Commissioned Officers and men on behalf of Lieutenant-Colonel W. Turner and other officers for their unswerving support and devotion to duty.

"PROGRAMME.

"PART I.

Toast	'The King.'	
Selection	'Harry Lauder's Songs'	THE BAND.
Vocal Trio	'The Orpheus' .. Messrs. VERNON, MORGAN, and HORNSBY.	
Song and Dance	'My Pearl of Peru'	Pte. PATERSON.
Song	'Sweet Adeline'	Pte. YOUNG.
Humorous Skit	'The Fully Licensed Man'	Mr. FRANCIS.
Toast	'Our Officers' (Responded to by Major W. D. ERSKINE).	
Duet	'I don't want a Girl' Messrs. JACKSON and WILLIAMS.	
Song	'The Blue Alsatian Mountains'	Mr. ESH.
Song	'The Drum Major'	Bandsman MORGAN.
Song	'Susan Jane'	Major W. D. ERSKINE.
Selection	'The Arcadians'	THE BAND.
Song	'Truly Rural Conductor W. T. KITCHEN, A.O.C.	
Duet	'Parody on Jenny my own true Love' Messrs. JACKSON and WILLIAMS.	
Song	'If I were a Member of Parliament'	Mr. WILLIAMS.
Song	'The Mighty Deep'	Mr. CORNELL.
Song	'McPherson'	Major W. D. ERSKINE.
Toast	'Our Guests.'	
Selection	'The Quaker Girl'	THE BAND.

"PART II.

Song	'Songs of Araby'	Pte. ORTON.
Monologue	'The Labour Leader'	Mr. FRANCIS.
Song	'Where the White Nile meets the Blue'	Pte. YOUNG.
	Encore—'Somewhere.'	
Descriptive Song	'Only a False Alarm'	Conductor KITCHEN, A.O.C.
Song	'I seek for Thee in every Flower'	Mr. ESH.
Humorous Song	'If you're doing that for me you can stop'	Mr. JACKSON.
Comic Song	'What a Mouth'	Musician WATSON.
	Encore—'Upper Ten.'	
Glee Party	'Darkies' Serenade'	Cpls. LUCAS and WELLHAM, Ptes. MOORE, YOUNG, and CLAYDEN.
Song	'A Jovial Monk am I'	Mr. WILLIAMS.
Song	'Down the Vale'	Pte. ORTON.
Song	'True till Death'	Mr. CORNELL.
Pianoforte Selection	'Imitation of a Musical Box'	Mr. HOUGHTON.
Song	'Mary'	Mr. ESH.
Song	'Flanagan' (by special request)	Mr. WILLIAMS.
Humorous Trio	'Poor old Joe' Messrs. HORNSBY, MORGAN, and VERNON.	
Toast	'The Chairman.'	
Song	'I couldn't help but laugh'	Serjt. HUGHES.

'GOD SAVE THE KING.'

"No. 4720 Private J. T. Foster, R.A.M.C., has been most successful since September 5, 1910, in light-weight boxing competitions, not having, up to the present, been beaten. The undermentioned events have been won by him, the last being fought with 4-oz. gloves:—

"September 5, 1910, in a 6-round contest at Harrogate, knocked out his man in the 3rd round.

"November 26, 1910, 6-round contest at Scarborough, knocked out his man in the 3rd round.

"December 6, 1910, won the light-weight competition at York, open to the Northern Command.

"December 22, 1910, 10-round contest at Goole, beat, on points, F. Johnson, Light-weight Champion of Yorkshire and Lincolnshire.

"December 26, 1910, 10-round contest at Harrogate, knocked out Bandsman Reeves, Light-weight Champion 18th Hussars, in the 2nd round.

"At Harrogate, on November 21, 1910, a match took place for the 11-stone Wrestling Championship of Yorkshire, between W. Heppell (holder) and M. Paterson (No. 2225 Private, R.A.M.C.) (the challenger). Paterson gained the first fall in the quick time of one minute, and the second in two minutes five seconds, thereby winning the championship."

NOTES FROM DUBLIN.—Captain Boylan Smith writes, under date January 15, 1911: "Christmas in Dublin was celebrated by No. 14 Company in a manner which left few dull moments during Christmas week.

"The wards of the various hospitals were very tastefully decorated with evergreens and lances, the gifts respectfully of Lady Holmpatrick, Sir Frederick Shaw, and the Officer Commanding 5th Royal Irish Lancers.

"The patients did full justice to the generous fare provided for their Christmas Day dinner. To an onlooker it appeared as if few of them are yet converted to the advantages of a meat-free dietary.

"The men of No. 14 Company celebrated the festive season by a Christmas dinner and three dances, which were very largely attended and thoroughly enjoyed by all. The food and drink provided and demolished at these entertainments were of a nature to make anyone with a long handicap digestion feel lonely and out of place.

"The success of these festivities were entirely due to Serjeant-Major Jackson and the committee consisting of Corporal Lawson, Corporal Embelin, Private McCarrey and Private Knox, with Private White as the ever indefatigable, hardworking secretary.

"All the officers stationed in Dublin gave the women and children of the Company a tea, cinematograph show, and Christmas tree, on Thursday, December 29, which was attended by over 120 guests.

"In the absence of Mrs. Bourke, Mrs. Sawyer presented the toys from the tree to the children,

"The proceedings wound up with a hearty vote of thanks to Colonel Sawyer, who in a few well-chosen words thanked our Commanding Officer, Major Collins, and the ladies who had assisted in making the entertainment a success.

"On Thursday, January 5, Surgeon-General G. D. Bourke, C.B., K.H.P., Principal Medical Officer, Irish Command, came to Montpelier Hill Barracks to present the medal for long service and good conduct to Quartermaster-Serjeant R. Fleming, R.A.M.C. He was received by Colonel R. H. S. Sawyer, Administrative Medical Officer, Dublin District, the other officers on parade being Major D. J. Collins, Captain S. B. Smith, Captain J. H. M. Conway, Captain W. D. C. Kelly, Captain J. H. Douglass, Captain A. T. Frost, and Captain and Quartermaster G. F. Short.

"Addressing the Company, the Surgeon General congratulated Quartermaster-Serjeant Fleming on attaining this medal and expressed himself very pleased at having the opportunity of presenting it.

"The Surgeon-General then visited the wards and expressed much satisfaction at the appearance of the hospital."

Captain G. Short writes, under date January 6, 1911. "On Wednesday afternoon, December 28, 1910, a concert was held at the Royal Infirmary, Dublin, for the amusement of the patients.

"The dining-hall was most tastefully decorated, and everything was done by the staff of the Royal Army Medical Corps (Corporal Embelin and others) to assure the performers that so far as they were concerned nothing should be wanting.

"The programme included pianoforte solos by Captain G. F. Short, R.A.M.C., and Mrs. Morris, songs by Mrs. Dallas Edge, wife of the ex-Principal Medical Officer of Ireland, and Miss Wilson, Q.A.I.M.N.S., humorous songs and vocal duets by Miss Maud Morris and Lieutenant J. W. Lane, R.A.M.C. These latter were undoubtedly the 'hit' of the evening, and the performers were repeatedly recalled.

"The 'Recitation' by Miss Buckley, daughter of Serjeant-Major Buckley, R.A.M.C., was an illustration of what a young lady under careful and knowledgable training can be taught to do. At its conclusion she was loudly applauded. She later led five other

little maidens in gipsy and Japanese dances in costume, and although their movements were much hampered by the small stage, these turns brought down the house.

"Mr. Lane's 'Bassoon' song was deservedly encored. It is simply marvellous the control that this gentleman has over his instrument.

"Miss Rita Morris concluded the programme by playing popular airs for the patients to join in the chorus.

"The concert, which lasted from 5.30 p.m. to 7 p.m., appeared to be greatly appreciated by the patients and others, most of the items being encored, and all were applauded.

"After the concert, Major Collins, R.A.M.C., passed a vote of thanks to the ladies and gentlemen who so kindly contributed to the evening's enjoyment, and to the Matron and Nursing Staff for their kindness to the patients during Christmas, and especially to Miss Wilson and Mr. Lane in getting up the concert.

"The following ladies and gentlemen were present: Mrs. J. Dallas Edge, Lieutenant-Colonel and Mrs. R. G. Hanley, Major and Mrs. D. J. Collins, Captain and Mrs. D. O. Hyde, Captain and Mrs. S. B. Smith, Captain and Mrs. J. M. H. Conway, Mrs. Kelly, Captain W. D. C. Kelly, Captain and Mrs. J. H. Douglass, Captain and Mrs. Dawson, Captain and Mrs. G. F. Short, Lieutenant and Mrs. J. H. Lane, Mrs. Morris and the Misses Morris, Rev. Colbeck, the Matron (Miss Rannie) and Sisters, &c.

"It is a great pity that such concerts cannot be held, say, every fortnight, but the fact that no suitable place is provided, added to the confusion that usually follows the removal of certain furnishings from wards and other rooms to prepare staging and seating, acts as a deterrent. Of talent there is an abundance, and in these progressive days I think that a permanent staging should be erected in some room in all military hospitals where there are more than fifty patients continually under treatment. Given this, concerts, and even other classes of entertainment, for the enlivenment of the patients in hospital could, and would, be more frequently arranged."

NOTES FROM BELFAST.—Serjeant-Major Packard writes: "The Christmas season opened here with a tea, Christmas tree, and entertainment to the wives and children of Headquarters No. 15 Company, Royal Army Medical Corps.

"The room was very tastefully decorated for the occasion by the detachment, and the tree was artistically prepared and the presents arranged by Mrs. Otway.

"When the mothers and children arrived they sat down to a splendid tea, and they were waited upon by the officers and their wives.

"After tea a conjuring entertainment was given by Mr. Morris St. Clair, and was greatly enjoyed by all.

"Then for the great event of the evening. Our Company Officer, Captain D. L. Harding, disguised as Father Christmas, entered the room amid a fanfare of trumpets and with a heavily-laden bag of toys upon his back, which, to the great delight of the youngsters, he then distributed, causing much fun and laughter with his witty remarks in a rich Irish brogue.

"The mothers were not forgotten, as each one was given a turkey for their Christmas dinner.

"On Christmas Day a special dinner was prepared for the patients, the Officers, N.C.O.'s, and men waiting upon them and doing their best to help them spend a happy time.

"The Detachment Royal Army Medical Corps kept up their Christmas on the Monday. An excellent dinner was prepared and well served by Corporal Carhart. Lieutenant-Colonel Donnet and the officers attended to inspect the good things provided.

"After the health of the Officers had been drunk with much enthusiasm, the Commanding Officer acknowledged the toast in a few well-chosen remarks, and the officers then departed, leaving the men to spend a happy time.

"After dinner the detachment was at home to their friends in the garrison, and singing and dancing were kept up till the evening.

"On Tuesday, December 27, the patients were provided with a tea and afterwards entertained at a concert in one of the wards, which had been very prettily decorated under the supervision of Staff Nurse Miss C. Skinner.

"The Annual Smoking Concert of the Detachment Royal Army Medical Corps was held on New Year's Eve, Major E. S. C. Clark, Captains E. P. Sewell, and D. L. Harding, and Lieutenant J. R. Yourell being present. Over 100 guests attended, and a very enjoyable time was spent."

NOTES FROM GIBRALTAR.—Lieutenant-Colonel Allen writes, under date January 1, 1911: "No. 28 Company, Royal Army Medical Corps, stationed at Gibraltar, celebrated the Christmas season with great spirit tempered by discretion, amidst ideal weather. As Christmas Day fell on a Sunday no entertainment beyond the dinner was given, but sounds of merry-making were audible in the barrack-rooms early in the day, from whence also strains of music of a weird (not to say barbaric) character fell upon the ears of the passer-by.

"There were about seventy patients in hospital, the majority of whom were able to assemble in the dining hall at 12.30 p.m., and do full justice to the good fare provided for them. They were visited by Lieutenant-Colonel C. E. Faunce, R.A.M.C., Officer of the Military Hospital, who wished them all the compliments of the season.

"No extensive scheme of Christmas decorations was attempted, but the dining hall and patients' library, together with the principal wards, were tastefully decorated, the latter under the able supervision of the Acting Matron, Sister McKay (the Matron, Miss Richards, being on leave) and the nursing staff of Queen Alexandra's Imperial Military Nursing Service.

"The dinner for the Company was fixed at 1.30 p.m. Colonel Murray, Principal Medical Officer, accompanied by Lieutenant-Colonel Faunce, Officer in Command, No. 28 Company, and other officers, visited the men at dinner.

"The Principal Medical Officer received a specially hearty welcome as, to the general regret, it will be the last Christmas on which Colonel Murray will be present with us as our Principal Medical Officer.

"By kind permission of Lieutenant-Colonel Faunce, a concert was given by the Non-Commissioned Officers and men of the Company on Boxing night. A most enjoyable evening was spent. The musical talent of the Company came out strong, and a programme of twenty-two items was rendered. While all did well and received well-deserved applause from the audience, a special word of praise is due to Corporal Cragg who skilfully and untiringly accompanied the singers throughout the evening. The concert concluded with 'God Save the King,' and hearty cheers for Lieutenant-Colonel Faunce, R.A.M.C.

"On Thursday evening, December 29, the Royal Army Medical Corps gave a second concert at the hospital for the benefit of the patients. This was largely attended, among the audience being Lieutenant-Colonel and Mrs. Faunce and several other officers and their wives.

"The following programme was given:—

Overture	'The Bees' Wedding'	Mrs. WELLS.
Song (Comic)	'Flanagan'	Pte. CLOUGH.
Song (Sentimental)	'Thora'	Pte. OWEN.
Song (Comic)	'Robin Redbreast'	Pte. YOUNG.
Violin and Pianoforte Selection		Serjt. and Mrs. WELLS.
Song (Serio)	'I've been to Africa'	Pte. HOBBS.
Recitation	'Selected'	Mr. CHANDLER.
Song (Comic)	'Selected'	Dr. BOOTH, 2nd Queen's.
Song (Sentimental)	'Roses'	Pte. OWEN.
Sketch	'The Artistic Burglar'	Pte. SIMMONS. Pte. FAIRWEATHER.
Song (Serio)	'By the Blue Lagoon'	Pte. ROSS.
Song (Comic)	'Selected'	Dr. BOOTH, 2nd Queen's.
Song (Coon)	'The Silvery Moon'	Pte. CLOUGH.

'GOD SAVE THE KING.'

"Mrs. Wells, a well-trained and accomplished pianist, opened the concert with a pianoforte solo entitled 'The Bees' Wedding.' Mrs. Wells later on accompanied her husband, Serjeant Wells, R.A.M.C., in a violin solo. Serjeant Wells gave first 'Abschied von Nieder-Ungarn' by Belas, and then as an encore 'Broken Melody' by Van Biene. The amusing sketch entitled the 'Artistic Burglar' was cleverly rendered by Privates Simmons and Fairweather. All the other performers gave a good account of themselves. Mr. Chandler (Army schoolmaster) kindly assisted with a recitation, as also did Dr. Booth, 2nd Queen's Regiment, his comic rendering of the 'Fireman' being received as usual with enthusiasm.

"On December 31 a tea, followed by a cinematograph entertainment and a Christmas Tree, was given for the wives and children of the Royal Army Medical Corps.

"The tree, a noble specimen of its kind, reached from the floor to the ceiling of an empty ward. The presents had been selected and the tree dressed by Mrs. Murray,

Mrs. Faunce and Mrs. Allen, assisted by other ladies of the Corps, to whom much credit and thanks are due for the successful result attained.

"Lady Hunter, wife of our new Governor, most kindly also sent presents for each child. Her thoughtfulness was much appreciated.

"Colonel and Mrs. Murray received the married people and children as they arrived. Among those present to assist at the tea, and to help in entertaining the children, were Lieutenant-Colonel and Mrs. and Miss Faunce, Lieutenant-Colonel and Mrs. S. G. Allen, Major and Mrs. Brogden, Captain Ronayne, Captain and Mrs. Gibson, Captain and Mrs. and Miss Offard, and other officers and ladies of the Corps.

"After tea the children were treated to a cinematograph entertainment, which, judging by the shrieks of laughter and applause, was thoroughly enjoyed.

"The next item on the programme was the distribution of the toys from the Christmas Tree. Each child received three presents besides little additions in the way of sweets, oranges, &c., and so went home toy-laden and happy. After the toys had all been distributed, Lieutenant-Colonel Faunce proposed three cheers for the Governor and Lady Hunter, referring to the kindness of the latter in sending presents for the children, which were heartily given. Lieutenant-Colonel Faunce next called for three cheers for Colonel and Mrs. Murray, saying he was sure that all present shared in the great regret that he felt at the fact that Colonel and Mrs. Murray will have left us before another Christmas comes round. A most hearty response was given by all present. Colonel Murray, in reply, wished all the Corps at Gibraltar good health, good luck, and prosperity in the New Year.

"Our Christmas celebrations then terminated, with three cheers for Lieutenant-Colonel and Mrs. Faunce, and the Officers of the Royal Army Medical Corps, proposed by Serjeant-Major Dudman, R.A.M.C., and the singing of 'God Save the King' by the assembled company."

NOTES FROM ALEXANDRIA, EGYPT.—Serjeant-Major Jones writes, under date January 2, 1911: "The festive season has been well kept up at Alexandria. Although the Detachment is small, I think everyone concerned entered into the festivities with enthusiasm, and everything went off without a hitch in the proceedings.

"The patients' dining hall was tastefully decorated, and the patients had a splendid dinner on Christmas Day. Great credit is due to the Master Cook (Lance-Corporal Spencer) for the manner in which he worked, with very little assistance, throughout the whole of Christmas, both in the interest of patients and the Detachment.

"As Christmas Day fell on a Sunday we did not commence our festivities until Boxing Day. The barrack-room was brilliantly decorated with flags, coloured paper, &c., under the supervision of Corporal Tripp, assisted by Privates Reynolds, Davidson, Coney, and Vidler. Mottoes and sketches were artistically arranged all round the room, at the end of which a stage was erected.

"The Detachment Dinner, to which about twenty-five sat down (including visitors and attached men), was excellently served. The cooking left nothing to be desired, and the selection of viands reflects great credit on the Committee, Serjeant Harris, Lance-Corporal Carter, Privates Reynolds, Coney, Messenger, Davidson, and Bull.

"The Commanding Officer (Lieutenant-Colonel H. T. Knaggs), Captain G. H. Rees, the Matron (Miss Bond) and Sisters visited the detachment at dinner, and the season's greetings were heartily tendered by Lieutenant-Colonel Knaggs.

"In the evening a smoking concert was held in the barrack-room, the chair being taken by Serjeant Harris. The programme was a varied one, and all the items were excellently rendered, Serjeant Harris and Private Wilkins accompanying on the piano admirably.

"CHRISTMAS, 1910.

"PROGRAMME OF SMOKING CONCERT HELD AT ALEXANDRIA, BY THE DETATCHMENT No. 33 COMPANY, ROYAL ARMY MEDICAL CORPS.

Song	'One touch of Nature'	Pte. BERRYMAN.
Song	'Every nice girl loves a Sailor'	Pte. WILKINS.
Song	'As a Friend'	Serjt. HARRIS.
Pipe Selection		Pipers, 1st K.O.S.B.
Recitation	'Politics'	Pte. SARSFIELD.
Song	'There'll be no work to-morrow'	Pte. DAVIDSON.
Song	'Heroes'	Cpl. TRIPP.
Song	'Always'	Pte. CONEY.

Song	'What! What! What!'	L.-Cpl. Dow, A.S.C.
Song	'Where the White Nile meets the Blue'	Cpl. Pickering, K.O.S.B.
Song	'Adeline'	Lce.-Cpl. Wilson, A.S.C.

"*Interval.*

Song	'Let me Sing'	Pte. Berryman.
Song	'Close up'	Serjt. Harris.
Song	'Love me and the World is mine'	Mr. Dore.
Song	'Selected'	Cpl. Pickering, K.O.S.B.
Song	'Rachel'	Cpl. Tripp.
Song	'The Cowslip and the Cow'	Lce.-Cpl. Dow, A.S.C.
Song	'Genevieve'	Pte. Bull.
Song	'I do like to be beside the Seaside'	Pte. Wilkins.
Song	'Good old Jeff'	Pte. Wright.
Pipe Selection		Pipers, 1st K.O.S.B.

'God Save the King.'

"On Thursday the patients had a special tea, arranged by the Matron (Miss Bond) and the Sisters, followed by an excellent entertainment, arranged by Serjeant-Major Jones, the decorations and stage in the barrack room being utilized for the purpose. Among those present were Lieutenant-Colonel and Miss Knaggs, Captain and Mrs. Rees, Lieutenant Todd, Lieutenant Montgomery (1st Welsh Regiment), Matron A. S. Bond, Sisters Mackay, Davis, and Kaberry, Rear-Admiral Gedge, R.N., the Rev. W. Dickens, and many others.

"The artistes rendered their turns excellently, which were much appreciated by a large and enthusiastic audience. The string band of 1st Welsh Regiment (by kind permission of Lieutenant-Colonel Schofield and officers) under the direction of Bandmaster Mangelsdorff, considerably assisted with the programme.

"At the conclusion Lieutenant-Colonel Knaggs thanked the artistes for their kind efforts, and Serjeant-Major Jones for organising the concert.

"Patients' Christmas Concert, Military Hospital, Alexandria.
Thursday, December 29, 1910, commencing at 5 p.m.

"Programme.

"Part I.

(1)	*March*	'Our Regiment'	Band, 1st Welsh Regt.
(2)	*Comic Song*	'My old bassoon'	Lieut. R. F. Todd, R.A.M.C.
(3)	*Violin Solo*		Sjt. Grindrod, K.O.S.B.
(4)	*Song*	'Selected'	Miss Kaberry.
(5)	*Highland Fling*		Pipers, K.O.S.B.
(6)	*Song*	'Selected'	Lieut. Montgomery, 1st Welsh Regt.
(7)	*Pianoforte Duet*		Sister Kaberry and Capt. Rees.
(8)	*Comic Song*		Pte. Goodliffe, 1st Welsh Regt.
(9)	*Selection*		Band, 1st Welsh Regt.

Interval of ten minutes.

"Part II.

(1)	*Two-step*	'Peter Piper'	Band, 1st Welsh Regt.
(2)	*Sleight of hand tricks*		Mr. Yeates.
(3)	*Song*		Lieut. R. F. Todd, R.A.M.C.
(4)	*Violin Solo*		Sjt. Grindrod, K.O.S.B.
(5)	*Sword Dance*		Pipers, K.O.S.B.
(6)	*Song*	'Selected'	Sister Kaberry.
(7)	*Piccolo Solo*		Bandsman Everall, 1st Welsh Regt.
(8)	*Comic Song*		Pte. Goodliffe.
(9)	*Selection*		Band, 1st Welsh Regt.

'God Save the King.'"

NOTES FROM MALTA.—Serjeant-Major Collard writes: "It may be of interest to many of the Corps to know something of the doings here during Christmas. The headquarters (Cottonera) had their official dinner on December 26. The Company Barrack Room was artistically decorated for the occasion. Colonel R. Porter, Principal Medical Officer; Lieutenant-Colonel A. F. Russell, C.M.G., commanding 30th Company; Captain J. A. Hartigan, Company Officer; Captain Gibbon; Lieutenant C. Clarke; and Lieutenant A. R. Wright visited the men at dinner hour.

"The customary toasts were exchanged, after which everyone did justice to the excellent fare prepared by Private Towner. After dinner games of football and hockey were played. At 6 p.m. high tea was served, followed by an impromptu smoker.

"On 29th the annual Christmas tree was held at Valletta; all families from Cottonera, Imtarfa and Forrest hospitals took carrozzi, dghaisa, ferry, and train for the objective in the Strada Mercanti. Tea was served in No. 37 Ward, and an entertainment took place in No. 29 Ward. Mrs. and Miss Russell, assisted by several ladies of the Corps, prepared the tree and arrangements for the tea.

"Private Jonathan appeared as "Father Christmas," assisted by three comrades, and amused the children for an hour. The Rev. J. Blackbourne, S.C.F., C.E., exhibited lantern slides of pictures from all parts of the world, which proved both instructive and amusing.

"Lieutenant-Colonel Russell announced that Mr. J. Chambers, of London, as a thank offering upon the recovery of his son, Lieutenant Chambers, Sherwood Foresters (after an operation for appendicitis), also as an appreciation of the skill and attention during the time he was in hospital, had sent each child of the Corps a book. These books were happily selected to suit the requirements of all ages. Every parent was of opinion that the children had scored.

"The Annual Smoker also took place, and I cannot do better than append the account from the *Malta Chronicle*.

"The Headquarters, 30th Company, Royal Army Medical Corps, held their Annual Smoking Concert in the Military Hospital, Cottonera, on December 31. This event has come to be quite an institution in the garrison, and its popularity will certainly not have been lessened by Saturday's celebration, which was in every respect a success worth the capable and energetic management.

"The spacious room was prettily decorated and presented a bright and cheery aspect, the stage being very elegantly fitted up and furnished under the direction of Private Jonathan, who carried out the duties of Manager in a very efficient manner, the general direction being vested in the hands of Quartermaster-Serjeant Gibbs, who was faithful to his onerous trust. Bandsman Davies, 2nd Battalion Gloucestershire Regiment, presided at the piano and materially contributed to the success of the proceedings.

"At 8 o'clock the 'Circolo Silvestri' orchestra opened the programme with a charming overture, and at intervals during the evening the clever party entertained the company with a variety of pieces which did great credit to Professor Buhagiar and his talented musicians. Following a song by Private Johnstone, R.A.M.C., Private Price, R.A.M.C., gave effect to an excellent comic entitled 'If there's a Girl there, I'll be there.' Private Conway, R.A.M.C., displayed remarkable agility in a step-dance, which was warmly applauded.

"Lieutenant-Colonel A. F. Russell, C.M.G., together with Captain M. H. Babington, Captain J. H. Hartigan, Lieutenant C. Clark and Lieutenant A. R. Wright, R.A.M.C., having arrived and been warmly greeted, the programme was proceeded with as under: Song, 'Ireland,' by Serjeant Blair, R.A.M.C.; mandoline solo, Mr. Rizzo, which was exceptionally clever; song in female character, by S. B. A. Smythe, R.N.; song, 'Killiecrankie,' and 'She is My Daisy,' Quartermaster-Serjeant Gillespie, R.A.M.C.; song, selected, Mr. Hawes; song, 'Flight of Ages,' Serjeant-Major Collard, R.A.M.C., which was very well rendered, and a song 'Killaloo' by the ever-green Irish veteran, Mr. Kaine, A.S.C., which aroused a storm of applause.

"Overture, 'Mantelpiece,' by the Circolo Silvestri Orchestra, and a selection from 'Trovatore,' as an encore; Club Swimming Display, by Private Potter, 2nd Devonshire Regiment, followed by rope-skipping and dance in response to a clamorous demand for repetition; Sailor's Hornpipe, cleverly danced by Private Gibbons, R.A.M.C.; comic song by S. B. A. Evans, N.N.; Lightning Sketches, by Staff-Surgeon Hunt, R.N., which were wonderfully clever and accurate; song, 'The Trumpeter,' Serjeant-Major Collard, and 'Killarney,' as an encore: comic song, S. B. A. Ballard, R.N.; double turn, 'Mother, will you walk?' S. B. A. Smythe and Fitzgibbons, R.N.; clog dance, Private Potter, Devonshire Regiment.

"The pleasure of the evening was also considerably enhanced by Staff-Surgeon Hunt's 'Lightning Sketches,' the particular features being 'Turkish Delight' and 'Say 99.'

"The Matron, Miss Hoadley, and the ladies of the Queen Alexandra's Imperial Military Nursing Service, were 'At Home' on January 6, 1911, to a number of friends on occasion of a concert arranged by Captain Leslie, R.A.M.C., for the patients. During the concert Sir Ian and Lady Hamilton arrived.

"FORREST HOSPITAL.

"The small detachment of twelve men of the Royal Army Medical Corps stationed at Forrest Hospital gave a smoking concert in the Recreation Room, on Thursday evening, by kind permission of Lieutenant-Colonel H. L. Esmonde White. The room had been tastefully decorated by the detachment under the direction of Serjeant Ellis, the N.C.O. in charge, and the numerous expressions displayed on the walls left no chance for doubting that the entertainment had been specially arranged primarily as a farewell to the N.C.O.'s of the Suffolk Regiment, and secondly as an adieu to the departing year. Two striking designs representing a hobby horse of 1810 and an aeroplane of 1910 marked the progress of the last century. The chair was taken at 8 p.m. by Serjeant Ellis, when a large number of guests were present, and after the toast of 'The King' had been loyally honoured, the harmony of the evening commenced and was contributed to by Staff-Serjeant Couling, A.O.C.; Armt. S. S. Scott, A.O.C.; Armt. S. S. Forbes, A.O.C.; Serjeant Connor, Devon Regiment; Quartermaster-Serjeant Gillispie, R.A.M.C.; Private Johnson, R.A.M.C.; C. Eng. Art. Neal, R.N.; Armt. S. S. Biddle and others. Mr. Smith ably presided at the piano throughout the evening. During the course of the evening the following toasts were submitted by the Chairman: 'Our Visitors—the Suffolk Regiment,'; 'Lieutenant-Colonel and Mrs. White,' both of which met with a hearty reciprocation. A very pleasant evening was spent by all present, and terminated at midnight with the customary 'Auld Lang Syne,' and 'God Save the King.'

"I regret to report the death of the late Mr. Frank Oliver, ex-Staff-Serjeant Royal Army Medical Corps (No. 8474), who died on the island of Gozo, on November 2 last, after a short illness.

"Staff-Serjeant Oliver was well known in the Depot, Aldershot, as master cook in the early '90's,' also as a prominent footballer. He leaves a widow."

NOTES FROM CEYLON.—

"CHRISTMAS FESTIVITIES IN CEYLON.

"THE *bonne camaraderie* that exists between the members of the Corps in Ceylon made the Christmas festivities of the most enjoyable description. A splendid dinner, that did the greatest credit to Corporal Collins, was served at 6 p.m.; the table decorations were well chosen and attractive.

"In the absence of Lieutenant-Colonel Manders (on duty), Major MacDougall wished the Company a very enjoyable Christmas and a Happy and Prosperous New Year.

"A smoking concert was held on the evening of December 26, and a good and lengthy programme gone through. Several items other than those mentioned in the programme were given. Chief amongst these was a farcical comic song by Private Dean, 'Lining the Line,' and a recitation, 'Dirty old Brown,' by Private McHugh.

"PROGRAMME.

Song	'Boys in Red'	Staff-Serjt.-CARRITT, A.O.C.
Song	'Banks of Allan Water'	Pte. VYSE.
Song	'Selected'	Br. OSBORNE, R.G.A.
Song	'Months and Months'	Pte. BROWNE.
Song	'Popping'	Pte. SHEEHAN.
Song	'Mandalay'	Cpl. CLEARE.
Song	'Selected'	Cpl. MOLONEY, A.O.C.
Song	'For Old Times Sake'	Pte. HARROD.
Song	'Yip-i-addy'	Pte. DEAN.
Song and Dance		Cpl. MCDONNELL.
Song	'Selected'	Staff-Serjt. LE PETIT, A.O.C.
Song	'Liza May'	Serjt. SKINNER.
Song	'Eileen Alannah'	Cpl. SHARP, A.S.C.
Song	'I'm only a G.D.O.'	Cpl. HARRIS.
Song	'Sally in our Alley'	Cpl. COLLINS.
Song	'I am but a poor Blind Boy'	Cpl. STUDLEY, A.S.C.

"GOD SAVE THE KING."

NOTES FROM SIMLA.—Lieutenant-Colonel R. S. F. Henderson, V.H.S., R.A.M.C., Secretary to Principal Medical Officer, His Majesty's Forces in India, writes as follows, dated December 22, 1910:—

"Lieutenant-Colonel B. M. Skinner, M.V.O., V.H.S., R.A.M.C., has been appointed

to the Command of the Station Hospital, Rawalpindi, *vice* Lieutenant-Colonel M. O'D. Braddell, R.A.M.C., transferred to Ahmednagar.

"Major G. E. F. Stammers, R.A.M.C., is appointed Sanitary Officer, 4th (Quetta) Division.

"*Leave.*—The grant of leave to the undermentioned officers has been concurred in :—

"Major G. St. C. Thom, R.A.M.C., general leave for five months from February 15, 1911.

"Major E. B. Steel, R.A.M.C., general leave for six months from March 24, 1911.

"Captain A. Dawson, R.A.M.C., general leave for six months from November 1, 1910.

"*Postings.*—On arrival from England, Lieutenant A. M. Pollard, R.A.M.C., is posted to the 2nd (Rawalpindi) instead of to the 1st (Peshawar) Division.

Specialists.—The following officers have been appointed Specialists in the subjects noted against them and posted to the Divisions shown :—

"Major T. H. J. C. Goodwin, D.S.O., R.A.M.C., Advanced Operative Surgery, 4th (Quetta) Division.

"Captain J. W. West, R.A.M.C., Advanced Operative Surgery 2nd (Rawalpindi) Division.

"Captain D. de C. O'Grady, R.A.M.C., Dermatology, 2nd (Rawalpindi) Division.

"Captain F. Ashe, R.A.M.C., Midwifery and Diseases of Women and Children 9th (Secunderabad) Division.

"Captain A. C. Amy, R.A.M.C., Electrical Science, 7th (Meerut) Division.

"Captain S. M. Adye-Curran, R.A.M.C., Prevention of Disease, Sialkote.

NOTES FROM SIERRA LEONE.—Major Leake writes under date December 20, 1910: "Lieutenant-Colonel A. A. Sutton, D.S.O., and the Officers of the Royal Army Medical Corps, were 'At Home' at the new 'recreation ground' on December 5, for their gymkhana. The 'function' has become an annual affair, and is looked forward to with pleasurable anticipation by the civil and military community.

"Invitations to the number of 130 were issued, and included His Excellency the Acting Governor and Mrs. Haddon-Smith, His Lordship the Bishop of Sierra Leone, Major-General Hamilton, C.B., and Mrs. Hamilton, Brigadier-General White (who was in the Colony at the time inspecting the Royal Garrison Artillery), and all the colonial officials and officers of the garrison, together with their wives. The events were as follows :—

"(1) Hammock Race.
"(2) Blindfold Driving Obstacle Race.
"(3) Lighting a candle on a Champagne bottle.
"(4) 'Limerick' Competition.
"(5) Whistling Race.
"(6) Orange Race
"(7) Menagerie Race.
"(8) Band Race.

"The entries were very numerous, more especially on the part of the ladies, and there was keen competition in every event.

"The animals driven in the menagerie race included a deer, two cocks, a sheep, and a monkey. A toad was also entered, but it became restive when its trainer attempted to harness it, and as it never came 'under the starter's orders,' it can safely be said that 'it took no part in the race.' The winner turned up in the monkey, but the sight of its master at the winning post helped it materially!

"By kind permission of Major Barchard and the officers, the excellent band of the 2nd Battalion West India Regiment performed the following programme of music :—

1.	*March*	'The Blue Riband'	*Bollog.*
2.	*Selection*	'Iolanthe'	*Sullivan.*
3.	*Barcarolle* from	'Les Contes d'Hoffman'	*Offenbach.*
4.	*Selection*	'The Dollar Princess'	*Fall.*
5.	*Waltz*	'Verschmähte Liebe'	*Lincke.*
6.	*Humoreske*		*Dvorak.*
7.	*Song*	'My Dreams'	*Tosti.*
8.	*Selection*	'The Merry Widow'	*Lehar.*
9.	*Gavotte*	'Stephanie'	*Czibulka.*
10.	*Characteristic*	'The U.S.A. Patrol'	*Coxmore.*

'GOD SAVE THE KING.'

"The afternoon, which by general consent was voted 'most enjoyable,' ended with the 'distribution of prizes,' a duty very kindly undertaken and gracefully performed by Mrs. Webb, the wife of our Specialist Sanitary Officer.

"On the call of His Excellency the Acting Governor, three hearty cheers were given for Mrs. Webb, Colonel Sutton, and the Officers, Royal Army Medical Corps."

RESERVE OF OFFICERS.

ROYAL ARMY MEDICAL CORPS.

Captain Jonathan Clerke to be Major, dated January 11, 1911.

The undermentioned Lieutenants have been confirmed in their rank:—

Henry R. Borcherds, M.B.

Charles J. Simpson, M.B.

To be Lieutenant (on probation): James Oliver Hamilton, M.B., dated November 9, 1910.

TERRITORIAL FORCE.

INFANTRY.

5th (Prince of Wales's) Battalion, The Devonshire Regiment.—Surgeon-Major Ernest P. A. Mariette, M.B., resigns his commission, dated December 21, 1910.

ROYAL ARMY MEDICAL CORPS.

2nd Home Counties Field Ambulance, Royal Army Medical Corps.—Captain David L. Hamilton, F.R.C.S.(Edin.), to be Major, dated December 14, 1910.

4th Southern General Hospital, Royal Army Medical Corps.—Captain Arthur E. Carver, M.D., resigns his commission, dated December 14, 1910.

5th Southern General Hospital, Royal Army Medical Corps.—Captain John Kyffin, from the List of Officers attached to Units other than Medical Units, to be Major, dated September 28, 1910.

2nd East Anglian Ambulance, Royal Army Medical Corps.—Captain George B. Masson to be Major, dated October 10, 1910.

1st London (City of London) General Hospital, Royal Army Medical Corps.—The surname of Captain George E. Gask, F.R.C.S.(Eng.), is as now stated, and not as announced in the *London Gazette* of September 29, 1908.

South Eastern Mounted Brigade Field Ambulance, Royal Army Medical Corps.—Major Percy C. Burgess to be Lieutenant-Colonel, dated November 24, 1910.

1st South Midland Mounted Brigade Field Ambulance, Royal Army Medical Corps.—William Henry Cusack, M.B., to be Lieutenant, dated September 3, 1910.

2nd Home Counties Field Ambulance, Royal Army Medical Corps.—Major Albert R. Henchley, M.D., to be Lieutenant-Colonel, dated November 26, 1910.

3rd West Lancashire Field Ambulance, Royal Army Medical Corps.—Captain Henry Dodgson resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated January 4, 1911.

Officers attached to Units other than Medical Units.

Lieutenant Francis W. Squair, M.B., to be Captain, dated November 17, 1910.

Captain James Middleton, M.B., to be Major, dated November 23, 1910.

Lieutenant Ivan C. Keir, M.D., resigns his commission, dated January 4, 1911.

OFFICERS' TRAINING CORPS.

Edinburgh University Contingent, Senior Division, Officers' Training Corps: Lieutenant William Darling, M.B., F.R.C.S.(Edin.) (serving with the Medical Unit), to be granted the local rank of Captain, with the pay and allowances of that rank, dated October 1, 1910.

VOLUNTEERS.

Surgeon-Lieutenant Abraham Ellenbogen resigns his commission, dated December 14, 1910.

WAR OFFICE,
January 10, 1911.

The King has been graciously pleased to confer the Territorial Decoration upon the undermentioned Officers of the Territorial Force, who have been duly recommended for the same under the terms of the Royal Warrant, dated August 17, 1908:—

ROYAL ARMY MEDICAL CORPS.

Major James Arthur Rigby, M.D., attached to the 2nd West Lancashire Brigade Royal Field Artillery.

Major Joseph Dallas Pratt, M.D., attached to the 4th (City of London) Battalion, The London Regiment (Royal Fusiliers).

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

The following lady has received an appointment as Staff Nurse: Miss M. M. Roberts.

Postings and Transfers.—Matrons: Miss A. Nixon, to Woolwich, from Shorncliffe; Miss E. A. Cox, to South Africa, from Connaught Hospital, Aldershot. Sisters: Miss J. E. Dods, to Shorncliffe, from Curragh; Miss M. M. Blakely, to Hounslow, from London; Miss K. Pearse, to London, from South Africa; Miss M. S. Ram, to Pretoria, on arrival in South Africa; Miss G. S. Jacob, to Pretoria, on arrival in South Africa; Miss G. M. Allen, to Bloemfontein, on arrival in South Africa; Miss K. Coxon, to Bloemfontein, on arrival in South Africa; Miss A. L. Walker, to Tidworth, from Netley; Miss L. Belcher, to Curragh, from Shorncliffe; Miss M. J. Hepple, to the Queen Alexandra Military Hospital, London, from Malta; Miss M. B. Williams, to Connaught Hospital, Aldershot, from Malta; Miss G. E. Larner, to London, from Royal Military College, Sandhurst; Miss S. Smyth, to Royal Military College, Sandhurst; from London; Miss M. L. Kaberry, to Cambridge Hospital, Aldershot, from Cosham; Miss E. M. Goard, to London, from Connaught Hospital, Aldershot; Miss M. Steenson, to Curragh, from London; Staff Nurses: Miss M. M. Roberts, to Cambridge Hospital, Aldershot, on appointment; Miss M. E. Davis, to Cambridge Hospital, Aldershot, on appointment; Miss E. M. Whittall, to Cosham, on appointment; Miss E. S. M. Forrester, to Dublin, from Colchester.

Promotions.—The undermentioned Staff Nurses to be Sisters: Miss A. C. Mowatt, Miss M. L. Kaberry.

Appointment confirmed.—Miss E. M. Collins.

Arrivals.—From South Africa: Miss K. Pearse, Sister; Miss A. M. Pagan, Sister.

UNITED SERVICES MEDICAL SOCIETY

THE next meeting of the above-named Society will be held at the Royal Army Medical College, Grosvenor Road, S.W., on Wednesday, February 8, 1911, at 5 p.m., when a paper will be read by Fleet-Surgeon R. C. Munday, R.N., on "Beri-Beri, its history in the Navy and in the Persian Gulf."

WARRANT OFFICERS AND SERJEANTS' (PAST AND PRESENT) ANNUAL DINNER CLUB.

A COMMITTEE Meeting was held in the Serjeants' Mess, Royal Army Medical Corps, Grosvenor Road, London, S.W., on Saturday, January 14, to discuss the details for the third annual gathering, the arrangements for which are now well in hand.

It was decided that the dinner be held in the "Pillar Hall" Restaurant, Victoria Station (S.E. Chatham and Dover Railway), London, S.W., on April 19 next, punctually at 7.30 p.m.

The Director-General, Army Medical Service, has kindly consented to occupy the chair.

Arrangements have been made for a reception room to be available for members at 6.30 p.m. for the usual preliminary chat.

The services of the Corps Band, whose presence contributed so much towards the enjoyment of the last gathering, have been obtained.

The members of the Serjeants' Mess, Grosvenor Road, London, S.W., have notified that they will be pleased to see any Country Members of the Club and provide tea, should they care to accept this invitation.

Notices will in due course be sent to all members at home, and it is hoped that those abroad will please accept this notice as intimation of the doings of the Committee.

The following have joined the Club since the publication of the last notice: Messrs. R. T. Browne, S. C. Ravenshoe, W. J. Barrett, and W. H. Smith, Quartermaster Serjeant H. Cassell; Staff-Serjeants W. A. West, J. Cotter, W. T. Raven, T. Leaf, R. Spencer, F. Page and A. Johnson; Serjeants, W. Hinde and C. Jones.

ROYAL ARMY MEDICAL CORPS FUND.

PROCEEDINGS OF A COMMITTEE MEETING HELD AT THE WAR OFFICE ON JANUARY 17, 1911.

Present:—

Surgeon-General W. L. Gubbins, C.B., M.V.O., Chairman (in the chair).
Surgeon-General W. Donovan, C.B.
Colonel D. Wardrop, C.V.O.
Colonel A. Peterkin.
Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.
Lieutenant-Colonel E. O Wight.
Lieutenant-Colonel E. J. Risk.
Major E. M. Pilcher, D.S.O.
Major E. T. F. Birrell.
Major A. Bruce.

(1) The Minutes of the last meeting were read and confirmed.

(2) The Aldershot Band Accounts were considered and passed and are appended. A sum of £80 was voted for the current quarter's expenses. It was noted that Captain L. Cotterell has succeeded Major Stallard as Band President.

(3) The grants made from the General Relief Fund were considered and sanctioned. A list of recipients is published herewith.

ROYAL ARMY MEDICAL CORPS FUND.

RECIPIENTS FROM THE GENERAL RELIEF FUND FOR THE QUARTER ENDING DECEMBER 31, 1910.

Name	Age	District	Grant	Total	Remarks
Mr. G. D. ..	38	Portsmouth	10s.	10s.	To pay his child's fare to a London hospital.
Mr. J. S. H. ..	46	London ..	£1	£3 10s.	Destitute and out of work.
Mr. W. D. ..	31	Aldershot..	£1	£8	Suffers from tuberculosis.
Mr. T. M. ..	27	Portsmouth	£3	£3	Destitute and out of work.
Mrs. M. S. ..	40	Aldershot..	£4	£8	Has five children to support.
Mr. A. L. ..	39	Portsmouth	£4	£12	Suffers from locomotor ataxy.
Mrs. E. P. ..	44	,,	£4	£12	Poverty.
Mrs. R. W. ..	26	,,	£3	£3	Poverty. Suffers from ill-health.
Mr. W. D. ..	29	Aldershot..	£4	£5	Suffers from V.D.H.
Mr. G. R. G. ..	48	,,	£4	£12	Unable to work through blindness.
Mrs. L.	30	London ..	£1	£1	Poverty.
Mr. H. F. ..	44	,, ..	£1	£1	,,
Mr. H. S. ..	43	Aldershot..	£4	£4	Suffers from aneurysm.
Mr. W. C. ..	28	Devonport	£3	£3	Destitute and out of work.
Mrs. J. F. ..	24	Edinburgh	£3	£3	In distressed circumstances.
Mrs. L... ..	51	Belfast ..	£4	£14	Nearly blind.
Mr. B. M. ..	32	Eastbourne	£3	£3	Destitute and out of work.
Mrs. S. McC. ..	36	Dublin ..	£4	£12	Poverty.
Mrs. H. P. ..	34	Aldershot..	£4	£12	Poverty. Two children to support.
Mr. A. D. ..	44	Portsmouth	£4	£6	Destitution.

ROYAL ARMY MEDICAL CORPS BAND ACCOUNTS.

FOR QUARTER ENDING DECEMBER 31, 1910.

RECEIPTS.

	£	s.	d.
Balance Credit brought forward	16	12	3
Officers' (Aldershot) Subscriptions	16	15	0
Fares and Gratuities recovered from last Quarter ..	3	1	0
Secretary R.A.M.C. Fund Quarterly Grant	75	0	0
One Officer's Subscription	0	5	0
	£111	13	3

EXPENDITURE.

	£	s.	d.
Bandmaster's Salary	30	0	0
Band Pay	44	12	11
Postage	0	4	9½
Small Repairs Bandroom	0	10	8
Hawkes & Co., Music and Repairs	11	13	3
Boosey & Son, ,, ,, ...	8	11	4
Kessels & Co., ,, ,, ...	0	14	1
Stationery	2	5	11
Cheque Book	0	4	2
Altering Tunics	3	13	7
Electric Light Charges	0	3	0
Balance Credit	8	14	6½
	£111	13	3

LEONARD COTTERILL, *Captain,*
Band President, R.A.M.C.

ESTIMATE FOR QUARTER ENDING MARCH 31, 1911.

	£	s.	d.
Balance Credit	8	14	6½
Estimated Aldershot Subscriptions ..	16	7	6
Probable Grant required	77	16	8
	£102	18	8½

	£	s.	d.
Estimated expenditure under all heads	102	18	8½
	£102	18	8½

(4) The list of grants from Companies to the General Relief Fund which is attached to these Minutes was considered by the Committee, and it was resolved that the Secretary should write to the Officers commanding the Companies that did not subscribe during the year, calling their attention to the fact.

GENERAL RELIEF FUND. GRANTS FROM COMPANIES FOR THE YEAR 1910.

Company		£	s.	d.
1, 2, 3, and Depôt ..	Aldershot	50	0	0
4, 5, 21	Netley	5	0	0
6	Cosham	5	0	0
7	Devonport	6	10	0
8	York	5	1	9
9	Colchester		*Nil*	
10	Chatham	3	0	0
11	Dover	4	10	0
12 and 34	Woolwich	7	10	0
13	Edinburgh	5	0	0
14	Dublin	7	10	0
15	Belfast	5	17	0
16	Cork		*Nil*	
17	Curragh	5	0	0
18	London	2	0	0
19	Chester		*Nil*	
20	Tidworth	6	15	0
22	Cape Town		*Nil*	
23	Pretoria	25	0	0
24	Bloemfontein	15	0	0
25	Bermuda	5	2	0
26	Ceylon	5	0	0
27	Hong Kong	4	0	0
28	Gibraltar		*Nil*	
29	Jamaica	1	18	6
30	Malta	12	0	9
31	Mauritius	3	0	0
32	Singapore	2	0	0
33	Cairo	7	0	0
35	London		*Nil*	
Det. Standerton	Sale of R.A.M.C. huts	62	9	8
,, Middleburg		50	0	0
Camp of Instruction		2	15	0
Det. Potchefstroom		10	0	0
Carriage Field Ambulance		9	14	2
		£333	13	10

(5) The following special cases for General Relief were considered:—

(*a*) C. G. G., to be granted an in-patient ticket to the Brompton Hospital, provided he is a suitable case for admission.

(*b*) It was resolved that a grant of £5 be made to the widow of the late Quartermaster J. Mc.S., as a special case.

(*c*) It was resolved that a grant of £10 be made as a special case to Quartermaster and Honorary Major F. H.

(6) It was noted that girl Smith has been admitted to the Drummond Institute.

(7) The accounts for the year 1910 were considered and passed and are attached.

(8) A Sub-committee consisting of:—

Surgeon-General W. Babtie, V.C.

Colonel D. Wardrop, C.V.O.

Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.

Was appointed to consider and report to the next Committee Meeting their recommendations for carrying on the Secretarial work of the Fund.

(9) A sum of £8 15s. was sanctioned for an Office for six months.

F. W. H. DAVID HARRIS,
Lieutenant-Colonel,
Secretary.

ROYAL ARMY MEDICAL CORPS FUND.

STATEMENT OF ACCOUNTS FOR 1910.

RECEIPTS.			£ s. d.
Balance in hand, December 31, 1909—			
Current Account	£438 17 10		
Deposit Account	1,000 0 0		
		1,438 17 10	
Subscriptions		1,132 8 6	
Interest on Deposit Accounts		25 0 0	
		£2,596 6 4	

EXPENDITURE.			£ s. d.
Grants to Band			329 0 0
Grant to G.R. Fund..			60 0 0
McGrigor Statue, preparing ground			50 10 0
Removal of Wolseley Memorial			2 19 1
Memorial Window, Captain Hardy			25 0 0
Wreath for His late Majesty			15 0 0
,, Miss F. Nightingale			5 12 6
Working Expenses—			
Bankers' Charges			0 8 4
Secretary's Salary, Sept. 30, 1909, to Dec. 31, 1910			53 2 6
,, Allowance			26 0 0
Postage			1 14 7
Stationery			1 12 2
Printing			0 15 3
Shorthand writer			1 1 0
Balance in hand, December 31, 1910:—			
Current Account	£1,023 10 11		
Deposit ,, ...	1,000 0 0		
		2,023 10 11	
		£2,596 6 4	

GENERAL RELIEF FUND.

Receipts.			£ s. d.
Balance in hand, December 31, 1909—			
Current Account	£334 6 0		
Deposit Account	£200 0 0		
		534 6 0	
Grants—			
R.A.M.C. Fund		60 0 0	
Companies		333 13 10	
Subscriptions		5 11 0	
Dividends—			
Canadian Stock		19 19 6	
E. Indian Railway		16 9 8	
Rebate of Income Tax		3 2 5	
Interest on Deposit Account		4 19 11	
		£978 2 4	

Expenditure.			£ s. d.
Grants to Applicants			211 12 0
Corps of Commissionaires			10 0 0
Brompton Hospital			5 5 0
Soldiers' and Sailors' Help Association			15 0 0
Union Jack Club			25 4 0
Expenses on Change of Trustee			7 4 0
Scottish Veterans' Association			5 0 0
Association for Employment of Soldiers			5 0 0
Wreath for His late Majesty			5 0 0
Bankers' Charges			0 19 6
Balance in hand December 31, 1910—			
Current Account	£487 17 4		
Deposit Account	200 0 0		
		687 17 4	
		£978 2 4	

Investments.

Canada 3½ per cent. Debenture Stock	£609 6 9
E. Indian Railway 3½ per cent. Debenture Stock	£485 0 0
	£1,094 6 9

COMPASSIONATE SCHOOL FUND, 1910.

Receipts.	£ s. d.	Expenditure.	£ s. d.
Balance in hand, December 31, 1909—		The Royal Soldiers' Daughters' Home	133 0 0
Current Account £46 19 6		Drummond Institute	5 0 0
Deposit ,, ... 800 0 0		Gordon Boys' Home	2 18 0
	846 19 6	Glasnevin Orphanage	5 16 8
Interest on Deposit Account	17 12 10	Balance in hand, December 31, 1910—	
		Current Account £117 17 8	
		Deposit ,, ... 600 0 0	
			717 17 8
	£864 12 4		£864 12 4

BALANCE SHEET, 1910.

Assets.	£ s. d.	Liabilities.	£ s. d.
Balance, December 31, 1909 £829 3 4		To R.A.M.C. Fund..	2,023 10 11
Receipts by Pass Book 1,842 4 7		General Relief Fund	687 17 4
	2,671 7 11	School Fund	717 17 8
Less Expenditure by Pass Book	1,034 2 0	Outstanding Cheques	8 0 0
Balance in Bank, December 31, 1910	1,637 5 11		
By Deposits—			
R.A.M.C. Fund	1,000 0 0		
General Relief Fund	200 0 0		
School Fund	800 0 0		
	£3,437 5 11		£3,437 5 11

Examined and found correct,

Signed { E. M. WILSON, *Lieutenant-Colonel.*
R. J. S. SIMPSON, *Lieutenant Colonel.*

ARMY MEDICAL OFFICERS' BENEVOLENT SOCIETY.

PROCEEDINGS OF A COMMITTEE MEETING HELD AT THE WAR OFFICE ON JANUARY 17, 1911.

Present:

Surgeon-General W. L. Gubbins, C.B., M.V.O., President, in the Chair.
Surgeon-General W. Donovan, C.B.
Colonel A. Peterkin.
Colonel D. Wardrop, C.V.O.
Colonel Sir James Clarke, C.B., Bart.
Colonel J. Lane Notter.
Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.
Major W. H. Horrocks.
Major E. T, F. Birrell.

(1) The Minutes of the last Meeting were read and confirmed.

(2) A Grant of £30 was sanctioned for the orphan of the late Captain Carroll.

(3) The Accounts for 1910 were considered and passed.

(4) A sum of £8 15s. was sanctioned for an office for six months.

(5) A Sub-committee of Surgeon General W. Babtie, V.C.; Colonel D. Wardrop, C.V.O.; Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O, was appointed to consider and report to the next Committee Meeting their recommendations as to the best means of carrying on the Secretaryship of the Funds of the Corps.

(6) It was resolved to consider Rule IV. of the Society at the next Meeting.

LIEUTENANT-COLONEL F. W. H. DAVIE HARRIS,
Secretary.

NATIONAL LEAGUE FOR PHYSICAL EDUCATION AND IMPROVEMENT.

We have received the following appeal from the Secretary of the National League for Physical Education and Improvement:—

CLEAN MILK CAMPAIGN.

"A series of leaflets, addressed respectively to farmers, dairymen, and housewives, giving simple, clear and concise instructions for ensuring the cleanliness of milk, has been drawn up by a Committee of experts on the subject. An immense circulation is anticipated for this much-needed series of leaflets and, indeed, if they are to achieve their end, they will need to be distributed in their hundreds of thousands. It is satisfactory to note that within a few weeks of their publications they have been adopted by a very considerable number of public bodies, for distribution by their officials, and no fewer than 35,000 copies have already been sold. The League is anxious, however, to circulate *free* copies also, wherever they are most needed, and a large number of sympathisers have already offered their help. But for this funds are needed—some £520 to enable half a million free copies to be distributed. A special Clean Milk

ARMY MEDICAL OFFICERS' BENEVOLENT SOCIETY.

Statement of Accounts for the Year 1910.

Receipts.	£	s	d
To Balance in hand, January 1, 1910	340	17	10
,, Subscriptions	192	1	0
,, Dividends, 3 % Debenture Stock L. & N.W. Railway (*less* tax £11 13s 4d.)..	188	6	10
,, Dividends, 3 % Debenture Stock N.E. Railway (*less* tax £11 13s. 4d.)	188	6	4
,, Dividends, 2½ % Debenture Stock Midland Railway (*less* tax £9 6s. 8d.)	150	13	4
,, Dividends, 4 % Debenture Stock Caledonian Railway (*less* tax £69 9s. 8d.)	104	14	4
,, Dividends on £890 17s. 0d. Consols	18	14	2
,, Legacy from Surgeon-General Sir J. Mouat, V.C.. with interest	101	8	0
,, Rebate on Income Tax	59	5	6
	£1,344	7	4

Expenditure.	£	s.	d.
By Donations..	671	0	0
,, Secretary's Salary, September 30, 1909, to December 31, 1910..	53	2	6
,, Allowance	26	0	0
,, Auditor	1	1	0
,, Bankers' Charges	0	5	3
,, Printing	0	15	3
,, Postage	1	14	7
,, Stationery	1	12	2
,, Purchase of Consols	105	8	0
,, Balance in Bank December 31, 1910..	483	8	7
	£1,344	7	4

Securities.	£	s.	d.
3 % Debenture Stock L. & N.W. Railway	6,667	0	0
3 % ,, .. N. Eastern ,, ...	6,666	0	0
2½ % .. ,, Midland	6,400	0	0
4 % .. . Caledonian ,, .. .	2,280	0	0
Consols	890	17	0
	£22,903	17	0

We have compared the above statement with the books and papers relating thereto, and certify that it is correct. We have verified the Bank balance and the Investment in Consols, and have inspected the Certificates of the Investments in Railway Stocks as set out.

Portland House,
Basinghall Street, E.C.
January 12, 1911.

(*Signed*) EVANS, PIERSON & CO.
Chartered Accountants.

Campaign is, therefore, being raised, to which contributions, however small, are invited and which will be most gratefully acknowledged by the Secretary of the League at 4, Tavistock Square, London, W.C., who will also gladly supply specimen copies of the leaflets on application.

BIRTHS.

ELSNER.—On December 3, 1910, at No. 1 House, Artillery Barracks, Pretoria, South Africa, the wife of Captain O. W. A. Elsner, R.A.M.C., a son.

EDWARDS.—On December 8, at Vacoas, Mauritius, the wife of Captain G. B. Edwards, R.A.M.C., of a son. By cable.

PORTER.—On December 8, 1910, at West Kensington, London, to Colonel and Mrs. R. Porter, a son.

GRAY.—On January 13, at 90, Prince of Wales Mansions, Battersea Park, S.W., to Captain and Mrs. A. C. H. Gray, a daughter.

MARRIAGE.

FRANKLIN-CUNLIFFE.—On January 12, at Holy Innocents' Church, Fallowfield, near Manchester, Lieutenant C. L. Franklin, R.A.M.C., to Loïe, youngest daughter of the late W. O. Cunliffe, Esq., of Manchester.

DEATH.

HOWARD.—At Bournemouth, on January 2, 1911, Colonel Francis Howard, M.D., retired, aged 59 years. He entered the Service as Assistant-Surgeon (Staff) on September 30, 1867; served also in the Royal Artillery; became Surgeon, Army Medical Department, March 1, 1873; Surgeon-Major, April 28, 1876; Brigade-Surgeon, September 14, 1888, and retired on retired pay on December 6, 1893. He was promoted Colonel on the retired list (in recognition of services during the operations in South Africa) on October 18, 1902. His war service was: Afghan War, 1878-9. Medal. Egyptian Expedition, 1882. Medal, bronze star.

EXCHANGES, &c.

The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, Serle Street, London, W.C., not later than the 22nd of the month.

Full Dress Uniform, R.A.M.C., second-hand, but in fairly good condition, required for officer T. F. Height 5 ft. 10 ins., chest 40 ins. Apply Mr. W. J. Spencer, Zetland House, by Guy's Hospital, S.E.

Field Officer in India, due home trooping season, 1911-12, open to exchange to stay in India till February, 1913. Address, O. P. Q., c/o Sir C. R. McGrigor & Co., Charles Street, London, S.W.

A free issue of twenty-five excerpts will be made to contributors of all articles classified under the heading of Original Communications, Lectures, Travels, and Proceedings of the United Services Medical Society.

Any demand for excerpts, additional to the above, or for reprints, must be forwarded at the time of submission of the article for publication, and will be charged for at the following rates, and additional copies at proportionate rates:—

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12	4	0 2 6	0 1 0	3	6	0	11	3	2	0	7
	8	0 4 6	0 2 0								
	16	0 7 6	0 3 6								
25	4	0 3 0	0 1 3	4	0	1	3	3	6	0	9
	8	0 5 6	0 2 6								
	16	0 9 6	0 4 6								
50	4	0 4 0	0 1 8	5	0	1	9	4	0	1	0
	8	0 6 9	0 3 2								
	16	0 12 0	0 5 3								
100	4	0 5 6	0 2 9	6	6	3	3	5	6	2	0
	8	0 9 0	0 4 4								
	16	0 16 9	0 6 9								
200	4	0 8 6	0 4 0	9	0	6	3	7	6	4	0
	8	0 13 6	0 6 0								
	16	1 3 6	0 8 9								

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Cases for Binding Volumes.—Strong and useful cases for binding can be obtained from the publishers at the undermentioned rates:—

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G. STREET & CO., Ltd., 8, Serle Street, London, W.C.
The back outside cover is not available for advertisements.

MANAGER'S NOTICES.

The JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January, but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

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THE HON. MANAGER,
"JOURNAL OF THE ROYAL ARMY MEDICAL CORPS,"
WAR OFFICE, WHITEHALL, S.W.

Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notified at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Captain N. E. Harding, J. S. Purdy, Esq., Captain and Quartermaster H. Spackman, Major F. W. Begbie, Lieutenant-Colonel S. Westcott, Major F. J. Wade-Brown, Major H. A. L. Howell, Lieutenant-Colonel A. G. Kay (R), Colonel Sir David Bruce, Major W. T. Mould, Captain N. D. Walker, Major S. L. Cummins, Lieutenant-Colonel W. A. Morris, Captain W. L. Bennett, Captain A. B. Smallman, Captain E. G. Ffrench, G. G. Nasmith.

The following publications have been received:—

British: Guy's Hospital Gazette, Medical Press and Circular, The Hospital, The Royal Engineers' Journal, Journal of the Royal Sanitary Institute, The Australasian Medical Gazette, The Practitioner, Red Cross and Ambulance News, Proceedings of the Royal Society of Medicine, Army and Navy Gazette, The Medical Review, The Lancet, The Journal of Tropical Medicine and Hygiene, The British Journal of Tuberculosis, The Quarterly Journal of Medicine, The Cavalry Journal, The Medical Officer, The Indian Ambulance Gazette, Journal of the Royal United Service Institution, Transactions of the Society of Tropical Medicine and Hygiene, The Indian Medical Journal, Sleeping Sickness Bureau, Reports of Public Health Department, New Zealand, Guy's Hospital Reports.

Foreign: Russian Army Medical Journal, Paris Médical, Annales d'Hygiene et de Médicine Coloniales, Bulletin of the Johns Hopkins Hospital, Le Caducée, Revista de Sanidad Militar, Tidskrift i Militär Hälsovard, Boletin de Sanidad Militar, Archiv. für Schiffs-und Tropen-Hygiene, Archives de Médicine Navale, Publications of the Massachusetts General Hospital, Le Nuove Caserme Italiane, Deutsche Militärärztliche Zeitschrift, Militaerlaegen, The Military Surgeon, Archives de Médecine et de Pharmacie Militaires, Annali de Medicina Navale e Coloniale, Bulletin de l'Institut Pasteur, American Medicine.

JOURNAL
OF THE
ROYAL ARMY MEDICAL CORPS.

Corps News.

MARCH, 1911.

CHANCERY OF THE ROYAL VICTORIAN ORDER, ST. JAMES' PALACE, JANUARY 17, 1911.

TO BE MEMBER OF THE FOURTH CLASS.

Captain Edward Scott Worthington, Royal Army Medical Corps.

ESTABLISHMENTS.

Royal Army Medical College, Lieutenant-Colonel Edmund J. E. Risk, Royal Army Medical Corps, to be Commandant and Director of Studies, *vice* Colonel D. Wardrop, C.V.O., M.B., whose tenure of that appointment has expired, dated February 4, 1911.

CAVALRY.

1st Life Guards, Captain George Sullivan Clifford Hayes, from the Royal Army Medical Corps, to be Surgeon-Captain, dated February 4, 1911.

FOOT GUARDS.

IRISH GUARDS.

Surgeon-Lieutenant-Colonel Philip H. Whiston retires on retired pay, dated January 28, 1911. He entered the Service as Surgeon, Medical Staff, July 29, 1890; was seconded for service with the Egyptian Army, December 31, 1891, to January 14, 1899; became Captain, Royal Army Medical Corps, January 15, 1899, Major, July 29, 1902; Surgeon-Major, Irish Guards, October 15, 1902, and Surgeon-Lieutenant-Colonel, July 29, 1910. His War Service is: Expedition to Dongola, 1896; operations of September 19; despatches, *London Gazette*, November 3, 1896. Egyptian medal with clasp. Nile Expedition, 1897, 4th Class Medjidie, clasp to Egyptian medal; Nile Expedition, 1898; battle of Khartoum; despatches, *London Gazette*, September 30, 1898; 4th Class of the Osmanieh. Clasp to Egyptian medal.

ARMY MEDICAL SERVICE.

Colonel Douglas Wardrop, C.V.O., M.B., is placed on retired pay, dated February 11, 1911. Colonel Wardrop entered the Service as Surgeon, Army Medical Department, on March 6, 1880; became Surgeon-Major Medical Staff, March 6, 1892; Lieutenant-Colonel, Royal Army Medical Corps, March 6, 1900; Lieutenant-Colonel, Royal Army Medical Corps, with increased pay, December 10, 1902, and Colonel, August 14, 1907. He held the appointment of Commandant and Director of Studies at the Royal Army Medical College from February 4, 1908, to February 3, 1911. He was appointed a Companion of the Victorian Order on June 25, 1909. His War Service is: South African War, 1878-9. As Civil Surgeon in operations against Sekukuni and Zulu Campaign. Medal with clasp. Nile Expedition, 1898; Battle of Khartoum; despatches, *London Gazette*, September 30, 1898. Egyptian medal with clasp. Medal.

Lieutenant-Colonel Robert I. D. Hackett, M.D., from the Royal Army Medical Corps, to be Colonel, *vice* D. Wardrop, C.V.O., M.B., dated February 11, 1911.

ROYAL ARMY MEDICAL CORPS.

The undermentioned Lieutenant-Colonels are placed on retired pay: James M. Reid, M.D., dated January 29, 1911; Charles W. S. Magrath, M.D., dated February 2, 1911; Louis W. Swabey, dated February 3, 1911.

Lieutenant-Colonel Reid entered the Service as Surgeon, Army Medical Department, on February 2, 1884; became Surgeon-Major, Army Medical Staff, February 2, 1896; Lieutenant-Colonel, Royal Army Medical Corps, February 2, 1904, and Lieutenant-Colonel with increased pay, November 17, 1909. His War Service is: Operations on

North West Frontier of India, 1897-8; with Tirah Expeditionary Force. Medal with two clasps. China, 1900; despatches, *London Gazette*, May 14, 1901. Medal.

Lieutenant-Colonel Magrath entered the Service as a Surgeon, Army Medical Department, on July 30, 1881; became Surgeon-Major, Army Medical Staff, July 30, 1893, Lieutenant-Colonel, Royal Army Medical Corps, on July 30, 1901. His War Service is: Egyptian Expedition, 1882; Battle of Tel-el-Kebir. Medal, with clasp; bronze star. Soudan Expedition, 1884-5. Nile clasp. Burmese Expedition, 1886-7. Medal with two clasps.

Lieutenant-Colonel Swabey entered the Service as Surgeon, Army Medical Department, February 5, 1881; became Surgeon-Major, Army Medical Staff, February 5, 1893, and Lieutenant-Colonel, Royal Army Medical Corps, February 5, 1901. His War Service is; Egyptian Expedition, 1882. Medal; bronze star. Soudan Expedition, 1885; Suakin. Clasp.

Lieutenant-Colonel John B. W. Buchanan, M.B., retires on retired pay, dated February 4, 1911. Lieutenant-Colonel Buchanan entered the Service as a Surgeon, Medical Staff, on January 30, 1886; became Surgeon-Major, Army Medical Staff, January 30, 1898; and Lieutenant-Colonel, January 30, 1906. His War Service is: South African War, 1898-1901; relief of Ladysmith, including action at Colenso; operations of January 17 to 24, 1900; operations on Tugela Heights (February 14 to 27, 1900), and action at Pieters Hill; operations in Natal, March to June, 1900, including action at Laing's Nek (June 6 to 9); operations in the Transvaal and Orange River Colony, November 30, 1900, to July, 1901; despatches, *London Gazette*, February 8, 1901. Queen's medal with seven clasps.

Major James W. Jennings, D.S.O., is placed on retired pay, dated January 31, 1911. Major Jennings entered the Service as a Surgeon, Medical Staff, on January 31, 1891, and became Major, Royal Army Medical Corps, on January 31, 1903. His War Service is: Expedition to Dongola, 1896; Egyptian medal. Nile Expedition, 1898; Expedition to Shendy; battle of Khartoum; defeat of Ahmed Fedil's Army; despatches, *London Gazette*, September 30, 1898, and May 5, 1899: D.S.O., fourth class of the Medjidie, clasp to Egyptian medal. Medal. South African War, 1899-1902; relief of Ladysmith, including action at Colenso; operations of January 17 to 24, 1900, and action at Spion Kop; operations of February 5 to 7, and action at Vaal Kraanz; operations on Tugela Heights, February 14 to 27, 1900, and action at Pieters Hill; operations in Natal, March to June, 1900, including action at Laing's Nek (June 6 to 9); operations in the Transvaal, east of Pretoria, July to November 29, 1900; operations in the Transvaal and Orange River Colony, November 30, 1900, to May 31, 1902; despatches, *London Gazette*, February 8, 1901. Queen's medal with five clasps; King's medal with two clasps. East Africa, 1903-4; operations in Somaliland; despatches, *London Gazette*, September 2, 1904. Medal with two clasps.

Lieutenant-Colonel Samuel Townsend, M.D., retires on retired pay, dated February 8, 1911. Lieutenant-Colonel Townsend entered the Service as a Surgeon, Army Medical Department, February 5, 1881; became Surgeon-Major, Army Medical Staff, February 5, 1893; Lieutenant-Colonel, Royal Army Medical Corps, February 5, 1901; and Lieutenant-Colonel with increased pay, July 22, 1905. His War Service is: North-west Frontier of India, 1897-8. Medal with clasp. South African War, 1899-1902; relief of Ladysmith, including action at Colenso; operations of January 17 to 24, 1900, and action at Spion Kop; operations of February 5 to 7, 1900, and action at Vaal Kraanz; operations on Tugela Heights (February 14 to 27, 1900), and action at Pieters Hill; operations in Orange River Colony, August, 1900; operations in the Transvaal, September to November 29, 1900; operations in Cape Colony, north of Orange River, May, 1900; operations in the Transvaal, November 30, 1900, to May, 1901; despatches, *London Gazette*, September 10, 1901. Queen's medal with five clasps; King's medal with two clasps.

The undermentioned Lieutenants are confirmed in their ranks: Wilfred W. Treves, M.B., Charles H. H. Harold, M.D., Eric L. Fyffe, M.B., Robert F. Bridges, M.B., Thomas J. Hallinan, M.B, John D. Bowie, M.B., Charles H. Stringer, Guy O. Chambers, John K. Gaunt, M.B., and Leslie F. K. Way.

The undermentioned Captains to be Majors, dated January 28, 1911:—

James G. Gill; Thomas C. Lauder, M.B.; Duncan E. Curme; Herbert S. Taylor; Francis J. Brakenridge; Nathaniel J. C. Rutherford, M.B.; Gilbert J. A. Ormsby, M.D.; Horace K. Palmer, Francis J. Palmer, Vincent J. Crawford, Arthur L. A. Webb; Howard Ensor, D.S.O., M.B.

MEMORANDUM.—Lieutenant-Colonel Robert S. F. Henderson, M.B., Royal Army Medical Corps, to be Honorary Physician to The King, and is granted the brevet rank of Colonel, *vice* Surgeon-Major General J. Sinclair, M.D., deceased, dated November 22, 1910.

HIGHER RATE OF PAY.—The undermentioned Lieutenant-Colonels have been selected for the higher rate of pay under Article 317, Royal Warrant, viz :—

N. Manders from January 29, 1911, *vice* J. M. Reid, retired.

C. Birt from February 8, 1911, *vice* S. Townsend, retired.

(Brevet-Colonel) R. S. F. Henderson, K.H.P., from February 11, 1911, *vice* R. I. D. Hackett, promoted.

Approval has been given to the grant of pay at the higher rate, under the provision of Article 317 of the Royal Warrant, to the undermentioned Majors, viz. :—

E. E. Powell, E. McK. Williams, J. C. Connor, F. W. Hardy, W. A. S. J. Graham, D. D. Shanahan, C. W. H. Whitestone, A. Pearse, C. Dalton.

LONDON GAZETTE.

The following notification appeared in the *London Gazette* of October 21, 1910 :—

Royal Army Medical Corps.—Serjeant-Major Edward William Newland, to be Quartermaster, with the honorary rank of Lieutenant, *vice* Honorary Captain G. L. Allen, retired, dated October 22, 1910.

SPECIAL RESERVE OF OFFICERS.

ROYAL ARMY MEDICAL CORPS.

To be Lieutenants (on probation): Robert McCheyne Linnell, dated January 6, 1911; William Crymble, dated January 13, 1911; Charles Alfred Bignold, M.B., dated January 17, 1911.

TERRITORIAL FORCE.

INFANTRY.

7th Battalion Princess Louise's (Argyll and Sutherland Highlanders)—Surgeon-Captain Peter McFadyen, M.B., resigns his commission, dated January 21, 1911.

ARMY MEDICAL SERVICE.

Colonel Philip E. Hill, Administrative Medical Officer of the Welsh Territorial Division, resigns his commission, and is granted permission to retain his rank, and to wear the prescribed uniform, dated January 18, 1911.

Lieutenant-Colonel and Honorary Surgeon-Colonel John Arnallt Jones, M.D., from the Sanitary Service, Royal Army Medical Corps (T.), to be Colonel, on appointment as an Administrative Medical Officer of a Territorial Division, dated January 18, 1911.

ROYAL ARMY MEDICAL CORPS.

3rd South Midland Field Ambulance, Royal Army Medical Corps.—Charles Ferrier Walters, F.R.C.S.Eng. (late Quartermaster and Honorary Lieutenant, 2nd Southern and General Hospital), to be Lieutenant, dated January 18, 1911.

2nd Southern General Hospital, Royal Army Medical Corps.—Quartermaster and Honorary Lieutenant Charles F. Walters, F.R.C.S.Eng., resigns his commission, dated January 18, 1911.

3rd Northumbrian Field Ambulance, Royal Army Medical Corps.—The undermentioned officers to be Captains :—

Lieutenant Oswald L. Appleton, dated August 9, 1910.

Lieutenant Percy R. Ash, dated August 19, 1910.

2nd London (City of London) General Hospital, Royal Army Medical Corps.—The appointment of Quartermaster and Honorary Lieutenant Thomas J. Spratley, which was announced in the *London Gazette* of June 30, 1908, is antedated to April 1, 1908.

Officers attached to Units other than Medical Units.

James Andrew Simpson, M.B., to be Lieutenant, dated October 12, 1910.

Captain James King Patrick, from the 2nd Lowland Field Ambulance, Royal Army Medical Corps, to be Captain, dated November 18, 1910.

Christopher Francis Murphy to be Lieutenant, dated November 29, 1910.

Captain (Honorary Captain in the Army) James C. G. Macnab, M.B., resigns his commission, dated January 18, 1911.

Captain John Paton, M.D., resigns his commission, dated January 21, 1911.

Frederick William Price, M.B., to be Lieutenant, dated September 28, 1910.

Frederick Andrew Worsley Drinkwater to be Lieutenant, dated December 1, 1910.

Hugh Paterson, M.B. (late Second Lieutenant, 4th Battalion, Queen's Edinburgh Rifles, the Royal Scots Lothian Regiment), to be Lieutenant, dated November 17, 1910.

ARRIVALS HOME FOR DUTY.—From India: On January 26, Major H. A. Hinge; Captains J. E. Powell, R. K. White, E. B. Booth, and W. G. Maydon. From

Mauritius: On February 1, Major C. A. Young. From South Africa: On February 1, Majors S. F. Clark and B. Forde. From Jamaica: On January 9, 1911, Lieutenant R. C. Galgey.

POSTINGS.—Scottish Command; Captain W. G. Maydon; Western Command: Major C. A. Young; Aldershot Command: Major B. Forde and Captain R. K. White; Irish Command: Captain E. B. Booth; London District: Majors S. F. Clark and H. A. Hinge.

TRANSFERS.—Lieutenant-Colonel H. D. Rowan from the Aldershot to the Southern Command.

APPOINTMENTS.—Lieutenant-Colonel H. H. Johnston, A.M.O., Chatham; Brevet-Colonel F. J. Lambkin, A.M.O. in South Africa; Lieutenant-Colonel H. D. Rowan, charge of Military Hospital, Tidworth; Lieutenant-Colonel J. Will, Staff Officer to A.M.O., Northumbrian Division, T.F.; Major C. A. Young, Staff Officer to A.M.O., Welsh Division, T.F.; Major H. A. Hingo, Recruiting Medical Officer, London District; Major W. D. Erskine, Staff Officer to A.M O., Lowlands Division, T.F.; Captain D. O. Hyde, Staff Officer to A.M.O., West Riding Division, T.F.; Captain E. Bennett's appointment as Adjutant to the R.A.M.C. School of Instruction, North Midland Division, T.F., has been extended to October 31, 1911.

QUALIFICATIONS.—Captain J. F. Whelan has obtained the Diploma in Public Health, and Captain D. P. Johnstone the Diploma in Tropical Medicine of the University of Liverpool; Captain W. H. Forsyth the Diploma in Tropical Medicine of the University of Edinburgh.

TRANSFERS TO HOME ESTABLISHMENT.—Captain H. O. M. Beadnell reverts to the Home Establishment as a tour-expired officer from March 8.

ARRIVALS HOME ON LEAVE.—Captains G. W. G. Hughes, G. De la Cour, and C. Kelly; Lieutenant W. H. S. Burney.

EMBARKATIONS.—For India; On February 8, Lieutenant-Colonel G. E. Hale, D.S.O.; Lieutenants D. S. Buist, D. E. C. Pottinger, C. H. O'Rorke, C. G. Sherlock, S. W. Kyle, J. W. Lane, A. T. J. McCreery, and R. H. Nolan.

For West Africa: On February 9, Major W. J. Taylor; Captains G. J. Houghton, T. B. Unwin, J. T. McEntire, and J. Fairbairn.

ROSTER FOR SERVICE ABROAD.—Exchanges have been approved between:—
Lieutenant-Colonels W. W. Pike, D.S.O., and C. R. Tyrrell.
Lieutenant-Colonel N. C. Ferguson, C.M.G., and Major A. H. Waring.

CHANGE OF NAME.—Major J. W. Cockerill, Reserve of Officers, Royal Army Medical Corps, by Deed Poll enrolled on December 23, 1910, assumed the surname of Kynaston in lieu of that of Cockerill.

RESULTS OF EXAMINATIONS.

The following results of examinations are notified for general information:—

Passed for the rank of Lieutenant-Colonel in all technical subjects: J. B. Anderson; W. S. Harrison, M.B.; F. Kiddle, M.B.; E. C. Hayes; E. T. F. Birrell, M.B.

Part I.—Subject (1) in A.M.O.: H. A. Berryman; D. Lawson; subject (2) in S. and E.: W. D. Erskine, M.B.; F. S. Clarke, M.B. Subject (3) in Med. Hist., &c.: B. W. Longhurst.

Passed in (*d*) ii, for promotion to the higher ranks:—

Majors: T. McDermott, M.B.; H. W. K. Read; H. A. Berryman; J. B. Anderson; W. S. Harrison, M.B.; C. W. Profeit, M.B.; S. H. Fairrie, M.B.; A. H. O. Young; S. O. Hall; R. H. Lloyd.

Captains: D. E. Curmo; H. E. M. Douglas, V.C.: L. Wood; F. S. Walker, F.R.C.S.I.; C. H. Straton; W. S. Crossthwait; S. B. Smith, M.D.; M. F. Foulds; C. A. J. A. Balck, M.B.; J. H. Curley.

Passed for promotion to the rank of Captain: In (*b*): B. A. Odlum; W. R. O'Farrell; in (*h*) Lieutenants D. E. C. Pottinger, M.B.; C. H. Sherlock, M.D.; R. C. Priest, M.B.; A. D. Stirling, M.B.; R. C. Paris; E. C. Lambkin, M.B.; M. White, M.B.; A. S. M. Winder, M.B.; J. R. Yourell, M.B.; J. J. Beckton. In (*h*) i: Captain J. H. Curley; Lieutenants H. T. Treves; A. C. H. Suhr, M.B.; A. T. J. McCreery, M.B.; F. W. M. Cunningham, M.B. In (*h*) ii: Captain J. H. Curley; Lieutenants H. T. Treves; F. W. M. Cunningham, M.B.; G. P. Taylor, M.B.; P. G. M. Elvery. In (*h*) iii: Lieutenants A. C. H. Suhr, M.B.; G. P. Taylor, M.B.; P. G. M. Elvery. In (*d*) ii: Lieutenants H. T. Treves; A. C. H. Suhr, M.B.; W. E. Marshall, M.B.; D. E. C. Pottinger, M.B.; W. H. O'Riordan; R. C. Priest, M.B.;

F. W. M Cunningham, M.B.; A. D. Stirling, M.B.; G. P. Taylor, M.B.; R. C. Paris; E. C. Lambkin, M.B.; O. W. McSheehy, M.B.; M. White, M.B.; J. J. D. Roche, M.B.; H. F. Joynt, M.B.; A. S. M. Winder, M.B.; P. G. M. Elvery, J. J. H. Beckton.

DISCHARGES.

9518	S.-Serjt. ..	Johnson, A. ..	31.1.11	After 18 years' service.
8678	,, ..	Scott, G.	4.2.11	Termination of second period.
8703	,, ..	Traynier, H. G. M.	10.2.11	,, ,, ,,
12281	Serjeant ..	Dunne, R.	17.1.11	,, first ,,
7530	Corporal ..	Hague, W.	20.1.11	,, second ,,
9884	Private ..	Corbett, S. M. ..	25.1.11	After 18 years' service.
1920	,, ..	Ford, E. E... ..	24.1.11	Medically unfit.
12298	,, ..	Leslie, F.	27.1.11	Termination of first period.
127	,, ..	Brill, G. W... ..	11.2.11	Medically unfit.
8680	S.-Serjt. ..	Rhodes, B.	7.2.11	Termination of second period.
7848	S.-Major ..	Henfrey, W. ..	30.1.11	To pension.

TRANSFERS TO ARMY RESERVE.

18234	Pte.	Gibbons, R. ..	8.1.11	1609	Pte.	Scarfe, A. H. ..	29.1.11
1525	,,	Robertson, U. M.	8.1.11	18298	,,	Quinn, J. W. ..	25.1.11
1535	,,	Erskine, J. ..	13.1.11	1581	,,	Horn, W. R. ..	23.1.11
1534	,,	King, T. ..	13.1.11	1597	,,	Brennan, J. ..	23.1.11
18255	,,	Barber, A. ..	13.1.11	1582	,,	Feasey, J. W. ..	26.1.11
18269	,,	Frayer, W. ..	15.1.11	1590	,,	Hagger, L. ..	27.1.11
1532	,,	Flake, F. W. ..	14.1.11	1776	,,	Rolls, J.	26.1.11
18267	,,	Lyon, J. O. ..	15.1.11	1580	,,	Gray, A... ..	23.1.11
1530	,,	Kennett, P. ..	12.1.11	1594	,,	Fishlock, A. R.	28.1.11
1544	,,	Farrow, J. ..	16.1.11	1599	,,	Michaels, J. ..	27.1.11
1545	,,	McClusky, F. ..	16.1.11	18295	L.-Cpl.	Aukland, G. ..	25.1.11
1543	,,	Pattison, H. ..	15.1.11	18302	,,	Smith, W. ..	26.1.11
1547	,,	Robinson, F. W.	17.1.11	1660	Pte.	Tetlow, E. E. ..	27.1.11
1559	,,	Wyatt, W. H. ..	19.1.11	1596	,,	Tipton, G. ..	29.1.11
1552	,,	Cullis, G. ..	19.1.11	1607	,,	Pond, W. T. ..	29.1.11
18280	L.-Cpl.	Golden, F. ..	20.1 11	1601	,,	Bilcher, J. ..	28.1.11
1560	Pte.	Anstey, W. A. ..	20.1.11	1637	,,	Wardle, A E. ..	30.1.11
1571	,,	Worth, E. ..	20.1.11	1636	,,	Hall, W. T. ..	31.1.11
1557	,,	Newman, J. ..	19.1.11	1775	,,	Dolan, W. ..	29.1.11
1570	,,	Gorton, C. ..	20.1.11	1602	,,	Ings, H. M. ..	28.1.11
18274	L.-Cpl.	Nixon, W. R. ..	19.1 11	1616	,,	Yates, H. C. ..	31.1.11
1563	Pte.	Newton, G. A. ..	20.1.11	18323	,,	Luke, F. ..	3.2.11
1561	,,	Morris, T. ..	20.1.11	1625	,,	Coulson, H. ..	3.2.11
18288	L.-Cpl.	Wheeler, C. ..	19.1.11	1621	,,	Smith, W. ..	2.2.11
1575	Pte.	Smyth, E. J. ..	19.1.11	1623	,,	Atkinson, W. ..	3.2.11
1564	,,	Walker, W. ..	20.1.11	1627	,,	Loughran, A. ..	3 2.11
1567	,,	Birkett, C. ..	19.1.11	1737	,,	Glenton, R. ..	2.2.11
18392	,,	Berry, H. Y. ..	28 1 11	18326	,,	Harris, R. E. S.	4.2.11
18754	,,	Bostock, J. ..	28.1.11	1631	,,	Steadman, F. G.	4.2.11
18355	,,	Ogden, L. ..	28.1.11	18325	,,	Becker, C. J. ..	4.2.11
1614	,,	Bates, G. ..	31 1.11	18349	,,	Edwards, A. ..	1.2.11
1576	,,	Warner, P. A. ..	21.1.11	1641	,,	Bloom, A. ..	6.2.11
18281	,,	Ramsey, H. P...	20.1.11	18287	,,	Collins, J. ..	10.2.11
1572	,,	Butterwick, W...	21.1.11	18342	,,	Morris, J. ..	6.2.11
18285	,,	Chambers, J. ..	22.1.11	18352	,,	Walden, G. A. E.	9.2.11
18290	,,	Diamond, P. ..	22.1.11	1650	,,	Ridewood, W. B.	9.2.11
1566	,,	Slingo, J. ..	22.1.11	1649	,,	Reid, E. ..	9.2.11
18296	,,	Turnbull, H. ..	25.1.11	1647	,,	Chillery, F. ..	9.2.11
1565	,,	Daniels, B. ..	21.1.11	1653	,,	Shannon, T. ..	11.2.11
1579	,,	Bray, C... ..	22.1.11	1651	,,	Young, H. G. ..	10.2.11
1585	,,	Workman, W. F.	22.1.11	1657	,,	Gelder, H. ..	11.2.11
1595	,,	Goodvick, J. ..	29.1.11				

TRANSFERS FROM OTHER CORPS.

10086	S.-Serjt. ..	Holding, A. W. ...	3.1.11	From Northern Nigeria.
5257	Private ..	Pinson, C.	4.1.11	,, Berkshire Regt.
11779	S.-Serjt. ..	Neenan, G... ..	14.2.11	,, E. A. Protectorate.

TRANSFERS TO OTHER CORPS.

11841	S.-Serjt. ..	Holmes, S. R. ..	8.2.11	To 3rd Lowland F.A., T.F.
5053	Private ..	Minchin, C. ..	9.2.11	,, Royal Marines.

DEATH.

4959	Private ..	Wilson, A.	18.1.11	At Netley.

THE FOLLOWING N.C.O.'S AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS.

For Quartermaster-Serjeant.

11660	S.-Serjt. ..	James, E.

For Staff-Serjeant.

8888	Serjeant ..	Fowler, A.	10209	Serjeant ..	Triggs, E.
10820	,, ..	Pearson, J.	13032	,, ..	Kerr, T.
12377	,, ..	Aldhous, B. L.	19253	,, ..	Wilson, C.

For Serjeant.

18463	Lce.-Serjt.	Day, F. W.	10955	Lce.-Serjt.	Rowe, J. H.
15648	,,	Hill, E. J.	10577	,, ..	Todd, J.
18717	,,	Hart, C. H.	11614	Corporal ..	Howard, W. H.
17726	Corporal ..	Murphy, C. P.	12712	,, ..	Hutchinson, W.
11929	,,	Cooper, W. J.	12768	,, ..	Kent, T. R.
13555	,,	Allen, W. J.			

For Corporal.

22	Private ..	Church, W. R.	19631	Private ..	Smith, J. F.
184	,, ..	Dodd, J. B.	14673	,, ..	Didron, G.
672	,, ..	Stevens, A.	2210	,, ..	Fletcher, W.
1097	,, ..	Herbert, R.	4302	,, ..	Steer, H.
2083	,, ..	Pearce, W. G.			

PROMOTIONS.

The following promotions, to complete Establishment, will take effect from the dates specified :—

To be Serjeant-Majors.

No.	Rank and Name		Date	Section	Remarks
10047	Qmr.-Serjt.	Figg, C. A. ..	22.10.10	..	*Vice* E. W. Newland, to H.M. Commission.
9800	,, ,,	Renton, W. C.	27.11.10	..	,, W. H. Taylor, to pension.
9006	,, ,,	Smith, G. J. ..	31.1.11	..	,, W. Henfrey, to pension.

To be Quartermaster-Serjeants.

9936	S.-Serjt. ..	Allwork H. ..	22.10.10	..	Reduction cancelled. Authority 110/Misc. /137 (A.G. 3) d/W.O. 18.10.10., *vice* C. A. Figg, promoted.
10089	,, ..	Chester, S. C. R.	6.11.10	..	*Vice* G. Cookson, to pension.
10445	,, ..	Haynes, E. ..	27.11.10	..	,, W. C. Renton, promoted.
10086	,, ..	Holding, A. W.	31.1.11	..	,, G. J. Smith, promoted.

To be Staff-Serjeants.

14464	Serjeant ..	Hurran, G. F.	11.10.10	..	*Vice* J. Robson, to Territorial Forces.
9552	,, ..	Mills, L. ..	19.10.10	..	Under para.351, King's Regulations. Supernumerary with Territorial Forces.
16402	,, ..	Colls, S. R. ..	22.10.10	..	*Vice* H. Allwork, reduction cancelled.
9578	,, ..	Dawson, W. ..	26.10.10	..	,, A. Lovett, to pension.
11613	,, ..	Morris, G. R. ..	26.10.10	..	,, W. Dawson, Supernumerary with Territorial Forces.
15948	,, ..	Christie, G. R.	1.11.10	..	,, C. G. Gurnsey, to pension.
10721	S.-Serjt. ..	Smith, A. ..	6.11.10	..	From Territorial Forces. *Vice* S. C. R. Chester, promoted.
11563	Serjeant ..	Ward, E. J. ..	27.11.10	..	*Vice* E. Haynes, promoted.
14663	,, ..	Snow, P. ..	16.12.10	..	,, W. R. Riordan, to pension.
11320	,, ..	Watts, R. ..	21.12.10	..	,, E. Purchase, reduced.
10950	,, ..	Virgo, H. V. ..	1.1.11	..	,, L. E. W. Tempest, to pension.
12386	,, ..	Purchase, E. ..	..	..	Reduction cancelled.

To be Serjeants.

12987	Lce.-Serjt.	Walter, B. ..	11.10.10	Cooking ..	Special as Superintending Cook, *vice* D. Macdonald, to Territorial Forces.
10965	Corporal ..	Howlett, J. ..	11.10.10	General Duty	*Vice* G. F. Hurran, promoted.
16266	,, ..	Talbot, R. S. ..	14.10.10	Nursing ..	,, J. Mann, reduced.
12989	,, ..	Barnes, E. G. W.	22.10.10	Q.A.I.M.N.S.	,, S. R. Colls, promoted.
16678	,, ..	March, J. E. ..	26.10.10	General Duty	,, G. R. Morris, promoted.
17022	,, ..	Weaver, A. R...	27.10.10	Nursing ..	,, W. T. Hughes, to Territorial Forces.
9878	Lce.-Serjt.	Robinson, J. ..	1.11.10	,, ..	,, G. D. Christie, promoted.
17542	Corporal ..	Colgan, R. ..	3 11.10	General Duty	,, E. G. J. Brice, to Territorial Forces.
12779	,, ..	Stubbs, G. ..	4.11.10	Nursing ..	,, G. Gillespie, to Colonial Government.
11741	,, ..	Hudson, H. ..	27.11.10	Clerical ..	,, E. J. Ward, promoted.
10076	Lce.-Serjt.	Brown, W. H...	16.12.10	Nursing .	,, P. Snow, promoted
12386	Serjeant ..	Purchase, E. ..	21.12.10	,, ..	,, R. Watts, promoted.
17521	Lce.-Serjt.	Parsons, H. G.	1.1.11	,, ..	,, H. V. Virgo, promoted.
8696	Corporal ..	Wason B. W. W.	18.1.11	,, ..	,, R. Dunne, discharged.

To be Corporals.

18988	Lce.-Corpl.	Haigh, R. H. T.	1.1.11	Clerical ..	To complete Establishment.
15655	,, ..	Caborn, G. J. ..		General Duty	
108	,, ..	Steer, G P. ..		Clerical ..	
19732	,, ..	Mayes, H. ..		Nursing ..	
19618	,, ..	Bettison, P. ..		Clerical ..	
45	,, ..	Moffatt, T. J. ..		Nursing ..	
19070	,, ..	Siddall, H. ..		,, ..	
12006	,, ..	Ward, G. ..		General Duty	
12245	,, ..	Penney, C. F...		Nursing ..	
12385	,, ..	Rayner, E. A ..		,, ..	
12594	,, ..	Wright, W. ..		General Duty	
18374	,, ..	Burke, A. ..		Nursing ..	
168	,, ..	Watkins, T. J.		General Duty	
16762	,, ..	Price, F. ..		Nursing ..	
17506	,, ..	Blong, P. ..		General Duty	
17060	,, ..	McGuire, T. ..		,, ..	

APPOINTMENTS.

The following appointments, to complete Establishment, will take effect from the dates specified :—

To be Lance-Serjeants (as Dispensers).

No.	Rank and Name	Date	Section	Remarks
11614	Corporal .. Howard, W. H.	1.1.11	Q.A.I.M.N.S.	To complete Establishment.
18032	,, .. Burns, J. I. ..		General Duty	
17102	,, .. Harvey, D. ..		,, ..	
18222	,, .. Dady, A. ..		,, ..	
18240	,, .. Johnson, W.B.T.		,, ..	

To be Lance-Corporals.

105*	Private ..	Newman, F. ..	24.10.10	Nursing ..	To complete Establishment.
1856*	,, ..	Leaney, A. F...	24.11.10	,, ..	
19007*	,, ..	Dare, J. R. ..	12.12.10	General Duty	
19093*	,, ..	Lane, A. ..	29.12.10	Nursing ..	
266*	,, ..	George, W. E...	1.1.11	1st Class Clerk	
754*	,, ..	Russell, H. ..		Nursing ..	
10353	,, ..	Warren, F. C...		General Duty	
11836	,, ..	Pitt, C. ..		Nursing ..	
12432	,, ..	Ward, A. ..		Cooking ..	
14603	,, ..	File, C. J. ..		Nursing ..	
16132	,, ..	Miller, J. E. ..		Cooking ..	
18312	,, ..	Howitt, J. ..		Nursing ..	
18409	,, ..	Horsfield, F. M.		,, ..	
18413	,, ..	Cooke, C W. ..		General Duty	
18444	,, ..	Hall, A. H. ..		Nursing ..	
18666	,, ..	Janes, J. ..		General Duty	
18734	,, ..	Wilson, S. ..		,, ,,	
18830	,, ..	Bell, F. ..		Nursing ..	
18829	,, ..	Chesterman, F.E.		1st Class Clerk	
18864	,, ..	Thorburn. J. ..		Nursing ..	

* Special under para. 281, Standing Orders, R.A.M.C.

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

The undermentioned non-commissioned officers and men have been selected for admission into Q.A.I.M.N.S., with increased pay at sixpence (6d.) a day, in accordance with Article 771, Royal Warrant for Pay, from the dates specified :—

No.	Rank and Name	Date	Station
14082	Serjeant .. Prince, G.	12.3.10	South Africa.
11656	Corporal .. Voisey, H. J. V. ..	15.7.10	Devonport.
16053	Serjeant .. Gawthorne, S. M. ..		Chester.
19175	Private .. Stow, F. E.		Curragh.
16564	Serjeant .. Vickers, C.		London.
11437	Lce.-Corpl. Deasley, J. W.		,,
18335	,, Woolway, W. J. ..	7.10.10	Malta.
14337	,, Sadler, G.		Aldershot.
19001	Private .. Barritt, J.		Mauritius.
19453	,, .. Wingate, A. C.		Egypt.
18157	Corporal .. Pruden, A.		Singapore.
17427	,, .. Higgins, L.		South Africa.

AWARD OF ARMY FORM C 344.

The undermentioned have been awarded A.F. C 344, on completion of three years' training, in accordance with sub-para. VI. of para. 22, Appendix 2, 1*a*, Standing Orders, R.A.M.C., on the dates specified:—

No.	Rank and Name	Date	No.	Rank and Name	Date
19598	Pte. .. Dawes, P. ..	17.9.10	15670	Serjt. .. Goodread, F. W.	30.9.10
19547	,, .. Mansell, W. A.	28.9.10	18948	,, .. Moore, E. ..	30.9.10
368	,, .. German, R. ..	29.9.10	18737	L.-Crpl. Stovold, W. T.	30.9.10
968	,, .. Fairweather, R. E.	29.9.10	19085	Pte. .. Vinton, C. J. ..	30.9.10
			264	,, .. Trout, A. ..	30.9.10
19858	,, .. Quickenden, G.J.	29.9.10	19983	Crpl. .. Savegar, W. C.	17.10.10
305	,, .. Hobbes, J. W.	29.9.10	284	Pte. .. Gregory, A. O.	17.10.10
560	,, .. Norris, F. J. ..	29.9.10	19958	,, .. Hamilton, F. W.	17.10.10
94	,, .. Price, D. W. ..	29.9.10	11896	Serjt. .. Spackman, A. P.	26.11.10
118	,, .. Rogers, A. C. ..	30.9.10			

NURSING SECTION.

The following appointments to the Nursing Section of the Corps will take effect from the dates specified:—

No.	Rank and Name	Date	No.	Rank and Name	Date
4651	Pte. .. Duncan, J. ..	4.10 10	4890	Pte. .. Tumilty, J. ..	4.11.10
4728	,, .. James, A. ..	4.10.10	4842	,, .. Ricks, A. C. ..	5.11.10
4794	,, .. Pither, A. G. ..	4.10.10	4858	,, .. Edwards, C. J.	5.11.10
4418	,, .. Smith, A. H. ..	13.10 10	4957	,, .. Grant, F. J. L.	5.11.10
4827	,, .. Hinton, H. ..	14.10.10	4379	,, .. Dunn, J. F. ..	8.11.10
4470	,, .. King, A. ..	27.10.10	4402	,, .. Hinchcliffe, G.W.	8.11.10
4624	,, .. Wharram, L.S.S.	27.10.10	4407	,, .. Bower, C. ..	8.11.10
4718	,, .. Armstrong, F.E.	31.10.10	4756	,, .. Morton, A. F. ..	8.11.10
4874	,, .. Besznak, F.H.B.	31.10.10	4777	,, .. Ball, F. ..	8.11.10
4669	,, .. Deacon, F. G. ..	31.10.10	4824	,, .. Burnell, W. D.	8.11.10
4871	,, .. Galpin, W. H. ..	31.10.10	4885	,, .. Russell, P. F. ..	8.11.10
2267	,, .. Parsons, F. W.	31.10.10	18887	,, .. Bell, W. R. ..	21.11.10
4596	,, .. Richards, G. R.	31.10.10	2172	,, .. Price, F. ..	12.12.10
4857	,, .. Hall, T. G. ..	31.10.10	4315	,, .. Whitaker, L. ..	23.12.10
16455	,, .. Babb, C. A. ..	2.11.10	1865	,, .. Johnstone, R. ..	29.12.10
4655	,, .. Allcock, C. R. ..	2.11.10	221	,, .. Long, G. J. ..	29.12.10
4709	,, .. Crossland, R.J.E.	2.11.10	5179	,, .. Clark, T. ..	29.12.10
4782	,, .. Meller, H. T. ..	2.11.10	14050	Serjt. .. Andrews, W. ..	31.12.10
4748	,, .. Cockle, G. L. ..	4.11.10	2245	Pte. .. Cripps, A. G. ..	31.12.10

ADVANCEMENT OF PRIVATES (CORPS PAY).

The following advancements in rate of Corps Pay will take effect from January 1, 1911:—

To be Advanced to the Third Rate (*at* 8*d.*).

As Orderlies.

No.	Name	No.	Name	No.	Name
14445	Smith, W. E.	19553	Flight, P. H.	304	Haskins, W. I.
14961	Monk, A.	19824	Worrell, C. H.	659	Rousell, S. T.
15384	Coles, C. E.	19871	Brash, R. H.	1018	Luker, H.
18428	Bourne, F. J. J.	19897	Freeman, V. H.	1860	Doyle, J.
19343	Bradley, S. E.	95	Thomas, A. G. W.	1808	McClay, W. J.
19359	Jarvis, J. A.	293	Hanchett, G.		

As Clerks.

No.	Name	No	Name	No.	Name
19271	Dale, A. W.	19986	Gardner, W. H.	1753	Aitken, A.
19583	Pickerden, T.				

To be Advanced to the Fourth Rate (at 6d.).

As Orderlies.

18891	Rainger C.	954	Hallett, H. C.	2028	Howard, J.
18967	Smith, W.	1818	Whitehead, J.	2123	Bates, S. J. P.
19097	Koftoff, A.	1932	Neville, W. E.	2191	Hayes, J. W.
19777	Harland, F.	2013	Connell, W. J.	1478	Cheater, H. C.

As Clerks.

19604	Pollock, R.	1868	Browne, E. B.	2212	Wilkin, W.
19813	Phillips, H.	1973	Elliott, W.	4352	Henry, C.
19963	Goreham, E.	2121	Taylor, C.	4384	Turner, S. G.
997	Corbett, T. F.	2124	Butt, W.	4653	Bartlett, C. J.

As Cooks.

12694	McCaffery, F.	109	Emment, A. G.	1637	Wardle, A. E.
19060	Kay, C. L.	210	Pearce, R.	1931	Lyons, C. A.
19177	Sheat, R.	1420	Smith, S.	4446	Hood, A.
19346	Hopper, B.	1615	Paddison, J. R.	4541	Sims, J. R.
77	Towner, A. E.				

SANITARY ORDERLIES (CORPS PAY).

The following Privates are advanced to the Fourth Rate of Corps Pay at 6d., as Sanitary Orderlies, in accordance with Letter, No. R.O./31/13, dated December 17, 1906, from the dates specified:—

No.	Name	Date	No.	Name	Date
660	Dotterill, H. C. ..	26.10.08	4735	Ellarby, R. H. ..	13.11.10
2085	Brooks, T.	28. 8.10	4952	Ingham, R.	19·11.10
18724	Hill, W.	12. 9.10	1501	Thompson, F. ..	20.11.10
1682	Emery, H. L... ..	22. 9.10	19376	Buss, F. E.	22.11.10
1793	Lines, A. E.	26. 9.10	4536	Asbey, T. C.	23.11.10
4811	Franklin, A. H. ..	4.10.10	2136	Bousfield, R. ..	24.11.10
4323	Burns, M.	5.10.10	4526	Cox, L.	1.12.10
1551	Richardson, P. ..	22.10.10	4443	White, E. H. ..	2.12.10
18832	Heard, G.	24.10.10	1863	Cowper, W. M. ..	10.12.10
1761	Buckell, A. J... ..	25.10.10	2058	Lilley, W.	14.12.10
2244	Cate, F.	28.10.10	4448	Brookfield, J. ..	20.12.10
18860	Worthington, J. ..	1.11.10	2199	Moran, S.	28.12.10
4408	Cherry, W.	5.11.10	4506	Imeson, W.	1. 1.11

BUGLERS.

The following boys are appointed Buglers from the dates specified :—

No.	Name	Date	No.	Name	Date
2192	Hayes, F. J. A. J. ..	3.11.10	4949	Tuson, L. I.	30.11.10
4738	Dell, G. L.	3.11.10			

TRANSFER SECTIONS.

The following Lance-Corporal is transferred from the "General Duty Section" to the "Clerical Section" from the date specified :—

No. 18490, Cooper, H.—1.10.10.

ARMY FORM C 344 (Certificate of Training as a Nurse).

(1) It is notified for general information that an examination for this certificate will be held on Monday, May 8th, 1911, and following day.

(2) Attention is invited to paragraphs 22 and 23 of the new Appendix 2, Ia, Standing Orders, R.A.M.C., 1907.

(3) With reference to paragraph 22 (1), a certificate must be forwarded stating that the fact that each candidate has satisfactorily completed the first and second year of training has been verified by the Register of Training, Army Book 300, and that he is at least of "Very Good" character.

(4) The names of intending candidates should be submitted to Record Office as early as possible, in order that the number for examination may be reported to the War Office.

(5) The names of those candidates who at the last examination failed in one subject only should also be submitted if they desire to be re-examined.

NOTES FROM ALDERSHOT.—Serjeant-Major Roberts writes :—

"ALDERSHOT ROYAL ARMY MEDICAL CORPS HARRIERS' CLUB.

"Staff-Serjeant Merchant and various runners of 'A' Company who, during the summer months had been in training under his supervision for the open flat race events in the Aldershot Command, suggested that a Club might be formed with the idea to further the development of running in the Corps. He therefore laid his views before Major N. H. Ross, who is keenly interested in the sporting proclivities of his men and gives them every assistance and encouragement. A meeting was held on November 14, 1910, notices having been sent to all Royal Army Medical Corps units in the command. The suggestion was fully discussed and it was unanimously decided that a club be formed and called the 'Royal Army Medical Corps Harriers' Club,' and that the vests worn should be white, with the Corps colours interwoven across the breast (thus reviving the old sporting colours which appear to have died out somewhat of late years). The officials elected were :—

"*President :* Lieutenant-Colonel G. D. Hunter, D.S.O.

"*Vice-President* and *Hon. Treasurer :* Major N. H. Ross.

"*Chairman :* Staff-Serjeant Merchant.

"*Captain* and *Hon. Secretary :* Private P. G. Elsey.

"*Sub-Captains :* Privates Mack and Jepp. A strong representative committee of the various companies are also elected.

"Lieutenant-Colonel G. D. Hunter has given every assistance to the Club, being the first member to join, and has watched with keen interest its progress and success. Private Elsey, having been elected Captain, was loudly cheered by all present, for in him we have not only a mainstay and support in the management and training of the men of the Corps, but as a tutor he could not be excelled locally. Amongst his many successes may be mentioned : Winner of the Johnson Challenge Cup twice, Half Mile Brigade Challenge Cup, and runner up in both the Half Mile and One Mile Championships of Hampshire. He also did very well last year in the Army Championships, and it is hoped that his deeds will stimulate others to emulate him. Staff-Serjeant Merchant enters into the spirit of true sportsmanship, being an old runner, swimmer, good shot, &c., but he has now to give way to younger blood.

"Several of our members have taken part in the principal civilian cross-country championships this season, and the Club was represented in the Junior Cross-Country Championship by Privates Elsey, Smith, Ainsley, and Ingham, and in the Annual

South of the Thames Cross-Country Championship by Privates Elsey, Smith, and Ingham. In both these races they put up very creditable performances, especially Private Elsey. The Club sent a representative team to New Malden, Surrey, to compete against the Surrey Athletic Club cracks and were only beaten by eight points. The next inter-club race was *versus* the Middlesex Regiment over a 6½ mile course, and was run in a ceaseless torrent of rain, the going being terrible. Private Elsey was first man home by ¾ of a mile, with Skipper second and Smith fourth.

"The Club then ran the 1st Hampshire Regiment over a 5-mile course, the rain rendering the going exceedingly heavy. The Corps won by thirty points, Elsey again being first, closely followed by Skipper, Button, and Smith. The first man of the Hampshire pack arrived home one minute twenty-six seconds behind our first man. Their next fixture was against the Leicestershire Regiment over a 5-mile stretch in beautiful weather, the Club again winning by eight points and supplying the first three men home in Privates Skipper, Smith, and Elsey. A 4-mile road race was arranged for the 'Boy' members of the Harriers Club against the Norfolk 'Boys'; they also won by the large number of forty-five points, getting seven of our boys home in front of the first Norfolk boy. The order of finishing was Bugler Page, Boy Steer, Bugler Dell, Bugler Forman, Boy Hague, &c. Page finished 2 minutes 25 seconds ahead of the first Norfolk boy. There is an Eight Mile Club Championship to be run off in February for a Silver Cup and Gold Medal presented by Private Elsey, besides other inter-club fixtures with other regiments in the command, and at the close of the Cross Country season there will be other championships for shorter distances held on the Corps Recreation Ground.

"As the members are mostly recruits, who will consequently be drafted to other stations, other companies will profit by the sport of this Club. I feel sure every member of the Corps wishes the Club every success for the 'blue ribbon' of cross-country running—namely, the Aldershot Command Cross-Country Championship which is to be held in March.

"Annual Championship Meeting.

"The members of the Royal Army Medical Corps Harriers' Club, who are also members of the Surrey A.C., held their first annual championship cross-country race on Saturday, February 11, at Aldershot. The championship cup, presented by P. G. Elsey, Surrey A.C., medals and badges, presented by Staff-Sergeants Merchant and W. H. Smith, Surrey A.C., were open to members of the club only, but in order to encourage members of the Corps who had not joined to qualify for places in the team to be selected for the Aldershot Command Cross-Country Championship next month, additional badges were offered for competition. The Corps' four crack runners for relay race teams, who are also members of the Surrey A.C., did not compete, so that the younger members would not be discouraged, a sporting trait that was much appreciated. Fourteen lads of 14 and 15 years old turned out, and all completed the course. The first boy in received a badge. The trail was laid by Private Wallace, the battalion champion of the 4th Middlesex Regiment, and P. G. Elsey, R.A.M.C., and it extended over a distance roughly of 7 miles of heavy ground soddened by a downpour of rain overnight.

"A pack of thirty-eight left McGrigor Barrack Square at 10.40 a.m., and proceeded across the Long Valley, making a tour round the racecourse, across the Basingstoke Canal, past Cody's aeroplane shed, the Reservoir, Army airship garage, and back to barracks *via* Farnborough Road. The run home was really a half-mile neck-to-neck race between Privates Smith and Skipper. They were waiting on each other, and when 40 yards from the winning post both spurted for first place. Skipper gained a yard on Smith, but when 10 yards from home stumbled, lurched against Smith, and fell heavily. On reaching the post Smith fell exhausted, and both men were assisted into the regimental baths, where they were promptly attended to. It was a splendid finish, and Skipper was unfortunate in losing when so near the prize. The return was as follows:—

Private Smith, 35 min. 15 sec.	1
,, Skipper, 35 min. 16 sec.	2
,, Button, 37 min. 55 sec.	3
,, Cox, 38 min, 20 sec.	4
,, Turner, 38 min. 23 sec.	5
,, Evans, 38 min. 34 sec.	6
,, Read, 39 min. 14 sec.	7
,, Bowers, 39 min. 20 sec.	8
,, Manus, 39 min. 41 sec.	9
Boy Steer, 40 min. 11 sec.	10

Others in order were: Boy Ballan, Boy Green, Private Collier, Private Phillips, Lance-Corporal Rodgers, Boy Page, Boy Caudell, Serjeant Rogers, Private Jones, and Boy Mason. The officials were: Judges, Major C. R. Morgan and Major W. H. Ross; referee, Colonel G. D. Hunter, D.S.O.; timekeeper, Captain G. G. Delap, D.S.O.; recorder, Staff-Serjeant Marchant; assistant-recorder, Private P. G. Elsey. In the absence of Surgeon-General Sir Thomas Galwey, Colonel Hunter presented the prizes immediately the winners had changed into uniform. He warmly complimented the competitors and also the committee upon the successful organization of the club, and trusted that many men would join. He urged the men to train steadily and not overdo it, and to have a bath and a change directly a race was over. He was pleased to present the prizes, and took the opportunity of complimenting Staff-Serjeant Merchant and Private Elsey on the success of their efforts.

FOOTBALL.

From the appended table it will be seen how the Corps team stands:—

Senior Military League—Northern Division.

	Played	Won	Lost	Drawn	Goals For	Goals Agst.	Points
2nd Grenadier Guards ..	13	8	1	4	57	16	20
2nd Royal Dublin Fusiliers	13	9	3	1	32	18	19
R.A.M.C.	14	8	3	3	27	14	19
1st Cameron Highlanders	15	7	4	4	30	22	8
1st Norfolk Regiment ..	13	6	3	4	26	19	16
2nd York and Lancaster ..	12	6	4	2	21	14	14
1st E. Lancashire Reg. ..	15	5	8	2	33	49	12
14th Brigade, R.F.A. ..	12	2	9	1	9	54	5
Army Service Corps ..	14	1	10	3	12	26	5
1st Dorset Regiment ..	12	1	9	2	11	27	4
12th Brigade, R.F.A. ..	11	0	7	4	7	27	4

Considering the many changes that have taken place in the team since last year, and the difficulty experienced by the Committee in obtaining new blood, the record to date is very creditable. The last two games *versus* 1st Dorset Regiment and A. S. C. were won by 4—1 and 2—0 respectively.

Positions in R.A.M.C. (Aldershot) Inter-Company League up to and including Matches on February 10, 1911.

	Played	Won	Lost	Drawn	Goals For	Goals Agst.	Points
"A" Company	8	6	1	1	23	13	13
No. 2 ,, ...	8	5	3	0	36	10	10
No. 1 ,, ...	5	4	0	1	21	5	9
No. 3 ,, ...	6	1	3	2	10	23	4
"C" ,, ...	9	0	5	4	13	25	4
"B" ,, ...	6	0	4	2	7	34	2

During the past few days No. 2 Company have met "A" "B" and "C" Companies, defeating them by 7—0, 10—1, and 5—1 respectively.

"A series of monthly whist drives have been held in our Serjeants' Mess, and happy little functions they have proved, being confined to our own members. Substantial and useful prizes have been given. The principal winners to date are:—

"Serjeant-Majors Bollen, Roberts, Woollard, Tod; Quartermaster-Serjeants Hook, Wickersham, Taylor; Staff-Serjeants Steele, Williams, Holmes; Serjeants Pickup, Wilson, Coombes, Muirhead, Simes, Morman.

"Serjeants M. Stroud, J. Pearson, Corporal R. H. Bennett, Privates Raggee, Sheehan, and Stoneham have embarked for Sierra Leone.

"Serjeant-Majors How, Renton, Rapson, and Ward, Quartermaster-Serjeant Polhill, Staff-Serjeant Gordon, Serjeants Godfrey, Leggatt, and Wrigglesworth, and thirteen men arrived from South Africa on February 1, and have proceeded on two months furlough.

"Serjeant-Major W. Carey and Quartermaster-Serjeant Carnell have been appointed to Cosham. Quartermaster-Serjeant Tite has proceeded to Ireland.

"Lieutenant F. R. Laing has been ordered to Bordon for duty.

"Judging from the local signs there is every indication of a record attendance from this station at the Serjeants' Corps Dinner in April next.

"No. 15488 Serjeant E. Sharp, and No. 12411 Corporal A. A. Sims have joined

No. 2 Company for duty. 1836 Private C. Dovey has rejoined No. 2 Company for duty."

NOTES FROM MALTA.—Serjeant-Major Collard writes: "The Corps in Malta during the present season have done exceedingly well in the football world, and the play has been well up to the standard of Aldershot soccer. At present we stand fifth on the Garrison League with 9 points against 13, and 11 of those above us. Yesterday we were to play the A. and S. Highlanders in the league, but owing to the absence of the official referee a friendly game was played, resulting in a win for 30 Company, 2 to nil, Lance-Corporals Lewis and Tipping scoring for their side.

"These are well known in Aldershot, also Whittaker, who is the centre forward. Corporal Turner as outside right would be an acquisition to the Aldershot team.

"The team here is known as the "Tabloids," taken particularly from Corporal Talbot who is the mainstay of the defence; the half line is also known as the 'T's' (Taylor, Thain and Tipping). Captain Beaman has returned from leave, and is a welcome addition to the team. We have received a bye in the 1st round of the Governor's Cup and meet the R.G.A. Central, whom we have already beaten in the league. Hopes run high.

"The Det. Serjeants' Mess at Valletta has moved into fresh quarters. Many may remember the old ophthalmic ward and dispensary; these have been re-appropriated to the new mess. There is to be a house warming on February 24; details of the event I hope to send later.

"The training has been in progress for the last month, and is continuing this, for the purpose of practising the company in field work; the company is divided into four sections of thirty-seven each. The preliminary training takes place at Cottonera (Headquarters), the advanced training will be at San Leonardo.

"The present season has been particularly wet and cold, snow flurries were experienced on the 9th inst. The Festa of the Shipwreck of San Paul being to-day, the 10th, we hope now the weather will turn.

The Junior N.C.O.'s and men's dance club is particularly strong. The dances are held fortnightly, and every credit is due to the committee, particularly Privates Andre, Herbert, and Powell. Our officers patronize the dance, and the warrant officers and senior N.C.O.'s join in the assembly. Preparations are being made to hold a quadrille party on St. Valentine's Day.

"Captain W. K. Beaman is posted to Forrest on return from leave. Captain J. B. G. Mulligan to Cottonera, Captain Marett to Cottonera from leave, and Lieutenant Wright to Forrest.

"Quartermaster-Serjeant Jones to Imtarfa, Serjeant Gray to Cottonera, Serjeant Kirby to Valletta.

"Serjeant Griggs is contemplating purchasing his discharge to farm in the U.S.A.

NOTES FROM SIMLA.—Lieutenant-Colonel R. S. F. Henderson, V.H.S., R.A.M.C., Secretary to Principal Medical Officer, His Majesty's Forces in India, writes as follows, dated January 19, 1911:—

"*Appointments.*—Major G. E. F. Stammers, R.A.M.C., is appointed Sanitary Officer, 4th (Quetta) Division.

"*Leave.*—The grant of leave to the undermentioned officers has been concurred in: Major G. M. Goldsmith, R.A.M.C., general leave for eight months from March 15, 1911; Major E. M. Morphew, R.A.M.C., general leave for eight months from March 1, 1911; Captain F. D. G. Howell, R.A.M.C., for six months on private affairs; Captain J. G. Gill, R.A.M.C., general leave for six months from March 18, 1911.

"*Specialists.*—The following officers have been appointed specialists and posted to the Divisions shown against them: Captain J. S. Gallie, R.A.M.C., dermatology, 6th (Poona) Division; Major R. F. E. Austin, R.A.M.C., laryngology, 3rd (Lahore) Division.

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

The following ladies have received appointments as Staff Nurse: Miss M. E. Evans, Miss M. Linaker.

Postings and Transfers.—Sisters: Miss H. Suart, to London, from Cosham; Miss A. M. Pagan, to Netley, on return from South Africa; Miss R. Osborne, to Royal Arsenal Hospital, Woolwich, from Royal Herbert Hospital, Woolwich; Miss F. M. Hodgins, to Devonport, from Woolwich; Miss E. M. Fairchild, to Potchefstroom, from Bloemfontein. Staff Nurses: Miss G. F. V. Temperley, to London, from Connaught Hospital, Aldershot; Miss A. I. Buyers, to Curragh, from Netley; Miss E. V. Forrest, to York, from Woolwich.

Promotions.—The undermentioned Sister to be Matron; Miss J. E. Dods. The undermentioned Staff Nurse to be Sister: Miss C. G. Lees.

Appointment confirmed.—Staff Nurses: Miss G. D. Morris, Miss J. L. Blakely.

ROYAL ARMY MEDICAL COLLEGE.

EXAMINATION FOR COMMISSION IN THE ROYAL ARMY MEDICAL CORPS.

Medicine (Case for Commentary).—Wednesday, January 25, 1911. Commencing 10 a.m. Time allowed. 1½ hours. Read your Instructions.

W. L., aged 69, auctioneer, was admitted to hospital December 5, 1909. He gave the following history:—

When a child he believes that he suffered from an illness which affected his throat, and was followed by difficulty in swallowing, and some affection of the eyes. From this he recovered completely.

At the age of 20 he had an illness lasting two months, accompanied by swelling of both knee joints; the ankles were also involved, a swelling appeared above the heel, and his feet became flat. Recovery was apparently complete.

Three years before admission he suffered from pain in the abdomen, referred to a spot above and to the right of the umbilicus, and occurring some hours after food; and at intervals from attacks of vomiting. He never brought up blood, and did not observe the condition of his motions. These symptoms continued for about six months.

Four months before admission a small lump appeared above the left clavicle; for a time this increased in size, but subsequently became smaller and of firmer consistence. About the same time he had pain in the right-hypochondriac region, and a swelling was noticed beneath the costal margin. He has been losing weight for the last four months. A week before admission he became jaundiced; this condition has persisted.

On examination a swelling was found in the right hypochondrium, moving freely with respiration; to the left of the middle line of the abdomen, but on a rather lower level, was another swelling, which appeared to be distinct from that first mentioned; it did not move with respiration. In the left supra-clavicular fossa an indurated nodular mass was found; this was not tender on pressure, but pain was complained of in that region, and at times down the left arm. The percussion note over the manubrium was wanting in resonance. The arterial walls were thickened; the second sound, at the base over the aortic valves, was accentuated.

Vocal fremitus was diminished at the base of the left lung, and the breath sounds there were feeble; a few crepitant râles were audible at the right base. The urine was normal.

Subsequent Course of the Illness.—The jaundice persisted; he continued to lose weight, although very slowly; the abdominal swellings increased in size, but that in the neck diminished. He died on March 22, 1910, with symptoms of biliary toxæmia.

Comment on the diagnosis of the various affections from which this patient suffered. State what treatment you would have adopted in each illness, and what conditions you would have expected to find on autopsy after that which proved fatal.

Surgery. (Case for Commentary.)—Wednesday, January 25, 1911. Commencing 11.30 a.m. Time allowed, 1½ hours. Read your instructions.

A woman, aged 30, was admitted to hospital with the following history:—

Six years previously she had been an inmate for three weeks suffering with vomiting and hæmatemesis. On two previous occasions she had also had attacks of hæmatemesis. During the six years she had also attended the hospital as an out-patient with gastric symptoms. She was suddenly taken ill with pain in the epigastrium, which was made much worse by taking anything by the mouth or by breathing deeply. About two or three hours afterwards vomiting commenced; diarrhœa with offensive motions was noticed about the same time. A little later the pain was felt in the right hypochondrium and epigastrium, and she became short of breath. Vomiting and diarrhœa were continuous until her admission to the hospital. Fifteen days after she was taken ill, her condition was as follows:—

There was a rounded tympanitic swelling in the epigastrium and extending to the right hypochondrium. The liver dulness was obliterated. Respiratory movements at the base of the right lung were diminished. There was dulness at the right base posteriorly as high as the tenth rib and the margin of dulness shifted forward 3½ inches on rolling the patient from her left side on to her back.

When turned on to her face the dulness of the right base was diminished. Further, when turned on to her right side the right half of the resonant swelling in the right hypochondrium and epigastrium became dull. The air entry on the right side of the chest was markedly diminished, especially at the base, and was absent over the dull area. Vocal resonance was diminished at the right base. The apex beat was in the fourth interspace, ½ inch outside the nipple. Pulse ranging from 96 to 102; temperature irregular, the highest evening being 100·4° F. Examination of the blood showed leucocytosis, white corpuscles 16,532, the increase being in the polymorphonuclear cells. An operation was performed on the sixteenth day of her illness; pus was found and the collection drained. Bacteriologically the pus contained the *Bacillus pyocyaneus* in pure culture. The patient improved at first, but subsequently went gradually downhill, and died thirty-seven days after the commencement of her illness. In addition to other changes at the site of the operation, a collection of pus was found on the outer side of the cæcum and ascending colon.

Discuss the diagnosis, also the operative procedure adopted in the treatment of the case.

Explain the source of the collection of pus found after death on the outside of the cæcum, and which was the chief cause of the fatal result.

Examination of Captains for Promotion to Major.

Hygiene (for class).—(Written.) Monday, January 30, 1911. From 10 a.m. to 1 p.m.

(1) It is decided to form a military station at a place where the only available source of water supply is the rainfall.

What information would you need to enable you to arrive at an idea of the amount available from this source? What are the chief sources of impurity in such a supply, and how would you guard against them? Would you anticipate the bacterial content to be large or otherwise?

(2) Describe in detail the absorption and metabolism of carbohydrates and fats. It is desired to design a ration supplying 5,000 calories, and the amount of protein is fixed at 200 grammes. How would you supply the remaining energy required? And what would guide you in settling the respective proportions of the two proximate principles? What actual food-stuffs would you select, and, speaking roughly, in what quantities?

(Note.—1 gramme of protein or carbohydrate = 4·1 gramme of fat = 9·3 calories.)

(3) How would you remove and dispose of the coarse and fine suspended matters of a domestic sewage? How does the problem of sewage disposal in barracks differ from that in a civil community?

(4) In what does disinfection consist? In the case of a barrack room which has been occupied by a man suffering from scarlet fever, what are the matters requiring disinfection, and what method would you adopt? How does a barrack room differ from a married quarter with regard to this question?

(5) When performing the bacteriological analysis of a water sample, after the concentration of the organisms present by means of alum and plating on neutral red bile-salt lactose agar, you find that, besides a few red colonies, a number of colourless ones grow up. Discuss the probable nature of these organisms, and describe how you would proceed to verify your opinion as to the class to which they belong.

Hygiene (for Class).—(Practical). Tuesday, January 31, 1911. From 10 a.m. to 1 p.m.

(1) Examine the sample before you and state whether you would approve of its issue to patients in hospital. Give reasons for your decision and state also how, in your opinion, the sample came to give such figures on analysis.

(2) Examine the bread of which complaints have arisen among the troops of whom you are in charge. They complain of dyspepsia and flatulence after eating it. What is the condition of the sample and the cause of the complaints, and are the latter, in your opinion, justified?

Pathology (for Class).—Written examination. Monday, January 30, 1911. From 2.30 to 5.30 p.m.

(1) Describe the blood changes in spleno-medullary leucocythæmia. Enumerate the conditions in which myelocytes may be found in the blood.

(2) Give an outline of the procedures you would employ in isolating and identifying the typhoid bacillus from—

(i.) An early case.
(ii.) The body of a case which had died during the third week of the disease.

(3) What organism is the cause of African relapsing fever (tick fever)? Describe its characters as seen—
(i.) In living specimens.
(ii.) In stained specimens.
State what you know of its life history and its mode of transmission.

(4) Describe the external anatomy of the adult *Schistosomum hæmatobium*. Describe the ova, and state what you know of the life-history. Enumerate the points of difference between *S. hæmatobium* and *S. catoi*.

Pathology (for Class).—Practical examination. Wednesday, February 1, 1911. From 10 a.m. to 1 p m.

(1) Report on the examination of the bacterial suspension marked with your number. Leave two stained specimens (one of which must be a Gram) beside your microscope.

(2) Mount and stain the section provided so as to demonstrate the presence of acid-fast organisms.

(3) Examine for protozoal organisms the unstained and unfixed blood film marked with your number.
Describe briefly what you see and give your diagnosis.
(N.B.—Leave the specimen in focus under your oil-immersion lens.)

(4) Give an opinion as to the nature of the organism or organisms present in the stained specimen with which you are provided.

WARRANT OFFICERS AND SERJEANTS' (PAST AND PRESENT) ANNUAL DINNER CLUB.

Since the last issue of the Corps News the following members have joined the Club: Mr. Evans; Serjeant-Majors Renton, How, Taylor (F. J.), and Carey; Quarter-master-Serjeants Polhill, Tite, and Flemming; Staff-Serjeants Gordon, Watt, and Holmes; Serjeants Glenn, Leggatt, Wrigglesworth, Butler, Suter, Godfrey, Sharp, Aston, Winn, and Dady.

The Honorary Secretary (Mr. H. Porter, 12, Cotford Road, Thornton Heath, Surrey), would again remind those members who have not already paid the third annual subscription that he will be glad to receive the same at their early convenience.

UNITED SERVICES MEDICAL SOCIETY

The next meeting of the above-named Society will be held at the Royal Army Medical College, Grosvenor Road, S.W., on Wednesday, March 8, 1911, at 5 p.m., when papers will be read by Lieutenant-Colonel P. J. Freyer (R.), I.M.S., on "The Symptoms and Modern Methods of Diagnosis of Stone in the Kidney; Ureter of Bladder," and by Colonel H. Hathaway, A.M.S., on "Ambulance Transport."

THE ARMY MEDICAL OFFICERS' WIDOWS' AND ORPHANS' FUND.

(Founded by Sir James McGrigor in the Year after Waterloo.)

New rules having been adopted in 1906, the attention of officers of the Corps who wish to make some provision for their widows and orphans, on the most advantageous terms, is invited to the benefits now offered by the above Fund, the strong financial position of which will be seen from the balance sheet.

Under these rules, owing to the large accumulated fund, and economical management on mutual principles, an officer can provide an annuity for his widow and orphans at a very moderate annual outlay.

The benefit provided by the Society to the subscriber's widow, under his marriage subsisting at the date of commencement of his subscription as a married member, is £50 per annum during widowhood, with the continuance of the annuity, during re-marriage of the widow or after her death, to the child or children of the said marriage until such child, or the youngest of such children, shall have attained the age of 21 years. Furthermore, should the wife of the subscriber predecease him, it will be optional for him to continue until his death the subscription he had been paying as a

married member, in order to provide an annuity similar to the above for the children of the marriage, until the youngest shall have attained the age of 21 years.

A detailed table of rates of subscription will be found at the end of the rules, of which some illustrative examples are here given :—

Husband's age	Wife's age	Annual subscription £ s. d.
25	20	13 8 5
25	25	12 6 5
30	25	14 18 6
30	30	13 9 10
35	30	16 14 5
35	35	14 17 6
40	35	18 17 7
40	40	16 9 10
45	40	21 8 6
45	45	18 7 7
50	45	24 9 5
50	50	20 11 1

If the disparity in age be less the rate of subscription is proportionately lower. Where the wife is the elder it is still further decreased.

These terms cover all war and climate risks, and there are no marriage fines for members now joining.

There is a class of unmarried members who pay £2 a year. They are allowed the equivalent (in terms of Table B in the rules) of the total of their subscriptions, at compound interest, by way of reduction of their annual subscriptions when becoming married members.

At the last quinquennial valuation of the assets and liabilities of the Society, as at December 31, 1905, the Actuary reported that "the financial position of the Society was *eminently satisfactory*"; the valuation balance sheet showing a *net surplus* of **£64,390** after providing for annuities, immediate and contingent, to all widows of members. At that date the funds of the Society amounted to **£125,400**. On December 31, 1909, it will be seen from the balance sheet that they had increased to **£133,000**, and that of this sum **£118,000** is invested in Government, and the remainder in trust securities.

Provision is made (Rule X.) whereby the surplus at any quinquennial valuation may be applied for the benefit of members, or their widows or orphan children.

The Rules, Annual and Actuary's Reports, Declaration Forms, and other information can be obtained from the Secretary,

CAPTAIN J. T. CLAPHAM,
20, Belgrave Road, S.W.

ROSTER OF INDIAN SERVANTS.

Captain M. F. Grant can recommend as khitmagar for an unmarried officer, Limboo, a Hindu, who was in his service for more than four years. Present address: c/o — Wylie, Esq., attached to Black Watch, Sialkot.

BIRTHS.

CORKERY.—On December 5, 1910, at Mount Abu, India, the wife of Major M. P. Corkery, R.A.M.C., of a son.

EVANS.—On December 30, 1910, at Lincoln House, Richmond, Surrey, the wife of Major Percy Evans, R.A.M.C., of a daughter.

JAMESON.—On February 8, 1911, at Silverlea, Farnborough, the wife of Captain A. D. Jameson, R.A.M.C., of a son.

DEATH.

TEEVAN.—On January 14, 1911, Honorary Deputy-Surgeon-General Thomas Teevan, late Army Medical Department, aged 78. He entered the Service as Assistant-Surgeon 3rd Foot, on June 30, 1854; became Surgeon (Staff), October 16, 1866; served also in 30th Foot; became Surgeon-Major Army Medical Department, March 1, 1873; and Brigade-Surgeon November 27, 1879; and retired on half pay, with the honorary rank of Deputy-Surgeon-General on July 30, 1880. War service: He served in the Crimea from November 17, 1855, including the Siege and Fall of Sebastopol. Medal with clasp and Turkish medal. Served also in the Campaign of 1860 in China. Medal with clasp for Taku Forts.

EXCHANGES, &c.

The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, Serle Street, London, W.C., not later than the 22nd of the month.

THE OFFICERS' EXCHANGE AND AGENCY CO.,

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Have several exchanges for Officers of all ranks (R.A.M.C.). Apply to Secretary.

A free issue of twenty-five excerpts will be made to contributors of all articles classified under the heading of Original Communications, Lectures, Travels, and Proceedings of the United Services Medical Society.

Any demand for excerpts, additional to the above, or for reprints, must be forwarded at the time of submission of the article for publication, and will be charged for at the following rates, and additional copies at proportionate rates :—

NUMBER OF REPRINTS	NUMBER OF PAGES	COST OF REPRINTS	COST OF EXCERPTS *	EXTRA FOR COVERS FOR REPRINTS			
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		£ s. d.	£ s. d.	s. d.	s. d.	s. d.	s. d.
12	4	0 2 6	0 1 0	3 6	0 11	3 2	0 7
	8	0 4 6	0 2 0				
	16	0 7 6	0 3 6				
25	4	0 3 0	0 1 3	4 0	1 3	3 6	0 9
	8	0 5 6	0 2 6				
	16	0 9 6	0 4 6				
50	4	0 4 0	0 1 8	5 0	1 9	4 0	1 0
	8	0 6 9	0 3 2				
	16	0 12 0	0 5 3				
100	4	0 5 6	0 2 9	6 6	3 3	5 6	2 0
	8	0 9 0	0 4 4				
	16	0 16 9	0 6 9				
200	4	0 8 6	0 4 0	9 0	6 3	7 6	4 0
	8	0 13 6	0 6 0				
	16	1 3 6	0 8 9				

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CASES FOR BINDING VOLUMES.—Strong and useful cases for binding can be obtained from the publishers at the undermentioned rates:—

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G. STREET & CO., LTD., 8, SERLE STREET, LONDON, W.C.

The back outside cover is not available for advertisements.

MANAGER'S NOTICES.

The JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January; but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in March and September of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters regarding non-delivery of the Journal, or change of address, should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps,' War Office, Whitehall, London, S.W., and reach there not later than the 20th of each month.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

THE HON. MANAGER,
"JOURNAL OF THE ROYAL ARMY MEDICAL CORPS,"
WAR OFFICE, WHITEHALL, S W.

Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notified at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Colonel Sir David Bruce, Major P. Evans, Lieutenant J. Gilmour, Major C. E. Pollock, Lieutenant-Colonel S. Westcott, Major S. F. St. D. Green, Captain J. M. Cuthbert, Captain A. Dawson, Lieutenant W. E. Marshall, Major G. W. Carter, Captain F. Harvey, Lieutenant G. H. Dive, Lieutenant-Colonel P. Hehir, I.M.S.

The following publications have been received:—

British: Journal of the United Service Institution of India, The Australasian Medical Gazette, Journal of the Royal Institute of Public Health, The Shield, The Practitioner, Journal of the Royal Sanitary Institute, Journal of the Royal United Service Institution, Report of the Army Veterinary Service, The Journal of Tropical Medicine and Hygiene, The Indian Medical Gazette, Red Cross and Ambulance News, Army and Navy Gazette, Proceedings of the Royal Society of Medicine, The Hospital, Guy's Hospital Gazette, Public Health, St. Thomas's Hospital Gazette, The Medical Review, Institute of Sanitary Engineers, The Lancet, The Middlesex Hospital Journal, Medical Press and Circular, Transactions of the United Services Medical Society, The Society of Tropical Medicine and Hygiene, Sleeping Sickness Bureau, The Indian Medical Journal, The Canadian Medical Journal.

Foreign: Giornale de Medicina Militare, Paris Médicale, United States Department of Agriculture, United States Naval Medical Bulletin, Archives de Médicine et Pharmacie Navales, Boletin de Sanidad Militar, Le Caducée, Deutsche Militärärztliche Zeitschrift, Japanese Medical Journal, The Canadian Journal of Medicine and Surgery, Archiv für Schiffs-und Tropen-Hygiene, Revista de Sanidad Militar, Archives de l'Institut Pasteur de Tunis, Office International d'Hygiene Publique, Russian Army Medical Journal.

JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS.

Corps News.

April, 1911.

FOOT GUARDS.

COLDSTREAM GUARDS.

Surgeon-Lieutenant Colonel Sir Warren R. Crooke-Lawless, C.I.E., M.D., retires on retired pay, dated March 15, 1911. Sir W. R. Crooke-Lawless entered the Service as Surgeon, Medical Staff, January 30, 1886; became Surgeon-Major, Army Medical Staff on January 30, 1898; exchanged into the Scots Guards, April 2, 1898; and to the Coldstream Guards, November 9, 1898; promoted Surgeon-Lieutenant-Colonel, August 22, 1902. He was seconded for Service on the Staff of His Excellency the Viceroy of India on November 2, 1905. He was appointed a Companion of the Order of the Indian Empire in 1907, and received the honour of Knighthood in 1910. His War Service is: South African War, 1899-1902. Advance on Kimberley, including actions at Belmont, Enslin, Modder River, and Magersfontein; operations in the Orange Free State, February to May, 1900, including actions at Poplar Grove, Driefontein, Vet River (May 5 and 6), and Zand River; operations in the Transvaal in May and June, 1900, including actions near Johannesburg, Pretoria, and Diamond Hill (June 11 and 12); operations in the Transvaal, east of Pretoria, July to November 29, 1900, including actions at Belfast (August 26 and 27); operations in the Orange River Colony (November, 1900); operations in Cape Colony, South of Orange River, 1900; operations in Cape Colony, December, 1900, to May 31, 1902; despatches, *London Gazette*, September 10, 1901, and July 29, 1902. Queen's medal with six clasps. King's medal with two clasps. Promoted Surgeon-Lieutenant-Colonel.

ARMY MEDICAL SERVICE.

Colonel Thomas [illegible] MacNeece, on completion of four years' service in his rank, retires on retired pay, dated February 16, 1911. Colonel MacNeece entered the Service as a Surgeon, Army Medical Department, on March 6, 1880; became Surgeon-Major, Medical Staff, March 6, 1892; Lieutenant-Colonel, Royal Army Medical Corps, March 6, 1900; Lieutenant-Colonel, with higher rate of pay, October 15, 1902; and Colonel, February 16, 1907. His War Service is: Nile Expedition, 1898. Battle of Khartoum. Egyptian medal with clasp. Medal.

Lieutenant-Colonel Henry H. Johnston, C.B., M.D., from the Royal Army Medical Corps, to be Colonel, *vice* T. F. MacNeece, dated February 16, 1911.

Colonel Arthur E. J. Croly is placed on retired pay, dated March 9, 1911. Colonel Croly entered the Service as Surgeon, Army Medical Department, on March 6, 1880; became Surgeon-Major, Medical Staff, March 6, 1892; Lieutenant-Colonel, Royal Army Medical Corps, March 6, 1900; Lieutenant-Colonel with increased pay, May 17, 1902; and Colonel, December 29, 1905. He was seconded for Service on the Staff of His Excellency the Governor of Bombay from September 19, 1899, to July 6, 1903. His War Service is: Afghan War, 1880. With the Southern Afghanistan Field Force. Operations on North-West Frontier of India, 1897-8; with Tirah Expeditionary Force. Medal with two clasps.

Lieutenant-Colonel Edmund J. E. Risk, from the Royal Army Medical Corps, to be Colonel, *vice* A. E. J. Croly, dated March 9, 1911.

Surgeon-General Sir Thomas J. Gallwey, K.C.M.G., C.B., M.D., retires on retired pay, dated March 15, 1911.

Sir T. J. Gallwey entered the Service as a Surgeon, Army Medical Department on March 31, 1874; was specially promoted Surgeon-Major, June 16, 1885 (*vide* War Service below); Surgeon-Lieutenant-Colonel, Army Medical Staff, September 30, 1893; Brigade-Surgeon-Lieutenant-Colonel, July 9, 1896; specially promoted Colonel, November 16, 1898 (*vide* War Service below); Surgeon-General local rank whilst Principal Medical Officer, Natal, November 15, 1899; Surgeon-General, June 1, 1902. He was seconded for Service with the Egyptian Army from March 25, 1892, to March 30, 1899. He was appointed a Companion of the Bath in 1896 for his services during the Dongola Expedition with which he served as Principal Medical Officer, and Knight Commander of the Order of St. Michael and St. George in 1901 for services in South Africa. He received the Imperial Ottoman Order of the Medjidieh in recognition of services to the Egyptian Government in 1896. He was awarded a Good Service pension of £100 a year from July 25, 1907. His War Service is: Afghan War, 1879—capture of Ali Musjid and expedition into Bazar Valley. Medal with clasp. Egyptian Expedition, 1882—action at Kassassin and battle of Tel-el-Kebir. Medal with clasp, bronze star. Soudan Expedition, 1884-5—Nile. In charge of Gubat Field Hospital, and movable Field Hospital, and in the engagements during return of Desert Force to Korti; despatches, *London Gazette*, August 25, 1885. Clasp, promoted Surgeon-Major. Expedition to Dongola, 1896. As Principal Medical Officer, operations of September 19; despatches *London Gazette*, November 3, 1896. C.B. Egyptian medal with clasp. Nile Expedition, 1897; as Principal Medical Officer, Egyptian Army. Nile Expedition, 1898: as Principal Medical Officer, Egyptian Army; battles of the Atbara and Khartoum; despatches, *London Gazette*, May 24 and September 30, 1898; promoted Colonel; two clasps to Egyptian medal. Medal. South African War, 1899-1900. Principal Medical Officer, Infantry Division, afterwards Principal Medical Officer, Natal. Relief of Ladysmith, including action at Colenso; operations January 17 to 24, 1900, and action at Spion Kop; operations, February 5 to 7, 1900, and action at Vaal Kranz; operations on Tugela Heights, February 14 to 27, 1900, and action at Pieters Hill; operations in Natal, March to June, 1900, including action at Laing's Nek, June 6 to 9; operations in the Transvaal, east of Pretoria, July to November, 1900; despatches (Sir R. H. Buller, March 30 and November 9, 1900), *London Gazette*, February 8, 1901. Queen's medal with six clasps. K.C.M.G.

Colonel George W. Robinson to be Surgeon-General, *vice* Sir T. J. Gallwey, dated March 15, 1911.

Lieutenant-Colonel William G. Birrell, from the Royal Army Medical Corps, to be Colonel, *vice* G. W. Robinson, dated March 15, 1911.

ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonel Richard E. R. Morse retires on retired pay, dated February 18, 1911. Lieutenant Colonel Morse entered the Service as a Surgeon, Army Medical Department, February 5, 1881; was seconded for Service with the Egyptian Army from February 1, 1887, to February 29, 1892; became Surgeon-Major, Army Medical Staff, July 12, 1893; Lieutenant-Colonel, Royal Army Medical Corps, February 5, 1901; and Lieutenant-Colonel with increased pay on February 13, 1907. His War Service is: Egyptian Expedition, 1882. Medal, bronze star. Soudan, 1889. Action of Arguin; action at Toski; despatches, *London Gazette*, September 6, 1889. Clasp; 3rd class Medjidieh.

The undermentioned to be Lieutenants (on probation), dated January 27, 1911: Benjamin Biggar, M.B.; James Dunlop Kidd, M.B.; Charles Morgan Finny, M.B.; Gordon Wilson, M.B.: William Struan Robertson Steven, M.B.; Edward Geoffroy Stayner Cane; William Arthur Frost, M.B.; Lieutenant William Thomson Graham, M.B., from the Royal Army Medical Corps Special Reserve. Francis Aidan Robinson, M.B.; Douglas Reynolds, M.B.; John Sutherland Levack, M.B.; Pierce Morgan Joseph Brett, M.B.; Patrick Hayes, M.B.; Lieutenant Thomas Alexander Weston, M.B., from the Royal Army Medical Corps Special Reserve. Walter Bisset, M.B.; Tom Chamney Russell Archer; William Lionel Evelyn Fretz, M.B.; Charles Douglas Kingsley Seaver.

The undermentioned Lieutenants are seconded under the provisions of Article 300, Royal Warrant for Pay and Promotion, 1909, dated January 27, 1911: Benjamin Biggar, M.B.; John S. Levack, M.B.; Thomas A. Weston, M.B.

Major John H. Rivers retires on retired pay, dated February 25, 1911. Major Rivers entered the Army as a Surgeon-Lieutenant, Army Medical Staff, on January 30, 1893; became Surgeon-Captain, January 30, 1896, and Major, Royal Army Medical

Corps, July 30, 1904. His War Service is: Soudan, 1905. Operations against the Nyam Nyam Tribes in the Bahr-el-Ghazal Province.

Captain William G. Aviss resigns his commission, dated March 8, 1911.

Lieutenant Reginald C. Galgey resigns his commission, dated March 11, 1911.

The date of the seconding of Lieutenant Thomas A. Weston, M.B., is January 31, 1911, and not as stated in the Gazette of February 17, 1911.

Quartermaster and Honorary Captain George A. Benson retires on retired pay, dated February 18, 1911.

Quartermaster and Honorary Major J. Hirst is placed on retired pay, dated February 28, 1911.

Quartermaster and Honorary Captain J. C. B. Whitehorn is placed on retired pay, dated February 27, 1911.

Serjeant-Major Andrew Ferdinand Tait to be Quartermaster with the honorary rank of Lieutenant, dated February 18, 1911.

Serjeant-Major Thomas Edward McColgin to be Quartermaster, with the honorary rank of Lieutenant, dated March 4, 1911.

Serjeant-Major Charles Henry Smith to be Quartermaster, with the honorary rank of Lieutenant, dated March 4, 1911.

Quartermaster and Honorary Lieutenant Alexander Lunney, is granted the honorary rank of Captain, dated February 16, 1911.

Quartermaster and Honorary Lieutenant A. F. Tait has been posted to the Aldershot Command for duty.

Quartermaster and Honorary Captain H. G. Hasell embarked for Malta on March 4, 1911.

The undermentioned Quartermasters and Honorary Lieutenants are granted the honorary rank of Captain, dated March 13, 1911. Aquila Clapshaw, William N. Archibald, James Watkins.

The King has been pleased to confer the dignity of a Knight of the United Kingdom upon Lieutenant-Colonel David Semple, M.D., Director Central Research Institute, Kasauli, dated January 2, 1911.

HIGHER RATE OF PAY.—The undermentioned Lieutenant-Colonels have been selected for the higher rate of pay under Article 317, Royal Warrant, viz.: M. W. Russell, H. A. Haines, G. E. Hale, D.S.O., A. T. I. Lilly, C. C. Reilly.

ARRIVALS HOME FOR DUTY.—From India: On February 22, Lieutenant-Colonel J. Meek; Captains G. H. J. Brown, M. C. Wetherell, and G. Ormrod. From South Africa. On February 15, Majors W. E. Hardy and J. C. B. Statham.

POSTINGS.—Southern Command: Lieutenant-Colonel J. Meek; London District: Major W. E. Hardy, Major J. C. B. Statham; Northern Command: Captain G. H. J. Brown; Irish Command: Captain M. C. Wetherell, Captain G. Ormrod.

TRANSFERS.—Colonel R. I. D. Hackett from South Africa to India; Major S. F. Clark from London District to Western Command; Major G. T. Rawnsley from Aldershot Command to Western Command; Captain H. E. M. Douglas, V.C., D.S.O., from Eastern Command to London District; Captain J. H. R. Winder from Eastern Command to Aldershot Command; Captain H. W. Russell from London District to Aldershot Command.

TRANSFERRED TO HOME ESTABLISHMENT.—Surgeon-General G. W. Robinson from South Africa, dated March 7.

APPOINTMENTS.—Surgeon-General G. W. Robinson, Principal Medical Officer, Aldershot Command; Lieutenant-Colonel J. Meek, charge of Military Hospital, Cosham; Major S. F. Clark, Sanitary Officer, Western Command; Major G. T. Rawnsley, Staff Officer to Administration Medical Officer, East Lancashire Division, T.F.; Major W. E. Hardy, charge of Military Hospital, Caterham; Captain J. H. R. Winder, Medical Charge of Families, Aldershot.

QUALIFICATIONS.—Captain C. H. Straton has obtained the Diploma in Public Health of the Royal Colleges of Physicians, London, and Surgeons, England; Captain C. A. J. A. Balck, the Diploma in Public Health (Honours) of the Royal College of Physicians and Surgeons, Ireland.

ARRIVALS HOME ON LEAVE.—Captain W. G. Aviss.

EMBARKATIONS.—For India: On March 3, Majors J. McD. McCarthy and G. B. Carter; Captains J. F. Whelan and A. C. Duffey; Lieutenants J. J. H. Beckton and W. B. Rennie.

For Egypt: On February 25, Captain R. N. Hunt and Lieutenant J. A. Clark; on March 18, Lieutenant P. G. M. Elvery.

For Malta: On March 4, Majors A. H. Morris and H. L. W. Norrington; Lieutenant A. C. H. Suhr.

SERVICE ABROAD.

The undermentioned officers will be required for service abroad during the coming Trooping season. Information as to destination and dates of embarkation will be published as soon as possible :—

LIEUTENANT-COLONELS.

Kirkpatrick, R., C.M.G.	Lane, C. A.	Wright, R. W.
Dodd, A.	Sexton, M. J.	Saunders, D. M.
Sloggett, H. M.	Lavie, T. G.	Donaldson, J.
Reilly, O. C.	Fallon, J.	
Hearn, M. L.	Macdonald, C. J.	

MAJORS.

McLoughlin, G. S., D.S.O.	Wanhill, C. F.	Sloan, J. M., D.S.O.
Healy, C. J.	O'Flaherty, A. R.	
Martin, C. B.	Lloyd, R. H.	

CAPTAINS.

Woodside, W. A.	Greenwood, A. R.	Mitchell, A. H. McN.
Prescott, J. J. W., D.S.O.	Jameson, A. D.	Foulds, M. F.
Seeds, A. A.	Douglass, P. C.	Wilson, R. C.
LLoyd, L. N., D.S.O.	Fleming, C. E.	Hyde, P. G.
Wood, L.	Stephens, F. A.	McMunn, A.
Connolly, E. P.	Fawcett, R. F. M.	Sampey, A. W.
Roch, H. S.	Jones, J. L.	Williamson, A. J.
Evans, C. R.	Worthington, E.S., M.V.O.	Rogers, H.
Parry, F. M.	Bransbury, H. A.	Kiddle, H. H.
Sewell, E. P.	Falkner, M. W.	Winder, M. G.
Straton, C. H.	Woodley, R. N.	Dawson, F. W. W.
Robinson, J. H.	Cowey, R. V.	Duguid, J. H.
Bennett, E.	Rowan Robinson, F. E.	
Tobin, J.	Bostock, J. S.	

LIEUTENANTS.

Wright, W. G.	Taylor, G. P.	Edwards, H. R.
Ranken, H. S.	Paris, R. C.	Yourell, J. R.
Manifold, J. A.	Bevis, A. W.	Robertson, H. G.
Dykes, S. S.	Lambkin, E. C.	Stanley, H. V.
O'Riordan, W. H.	McSheehy, O. W.	Field, P. C.
Benson, C. T. V.	Williamson, M. J.	Davies, R. M.
MacArthur, W. P.	Franklin, C. L.	Kinkead, R. C. G.
Priest, R. C.	White, M.	Stoney, E. C.
Tomlinson, P. S.	Roche, J. J. D.	Stallybrass, T. W.
Cunningham, F. W. M.	Hill, J. R.	Hutchinson, V. P
Parsons Smith, E. M.	Joynt, H. F.	
Stirling, A. D.	Winder, A. S. M.	

The above detail does not provide for unforeseen vacancies abroad which are of frequent occurrence, and the undermentioned officers whose names are high on the roster should hold themselves in readiness in the event of being required :—

Lt.-Col. J. B. Wilson.	Capt. J. P. J. Murphy.
,, J. H. Daly.	Lieut. J. M. Weddell.
Major R. J. W. Mawhinny.	,, C. M. Nicol.
,, J. Cowan.	,, A. P. O'Connor.
,, G. H. Goddard.	,, T. H. Dickson.

RESULTS OF EXAMINATIONS.

The following results of examinations are notified for general information :—

Passed for the rank of Lieutenant-Colonel :—

Part I.—Subject (1) in A.M.O.: J. V. Forrest, M.B.; subject (2) in S. and E.: A. C. Fox; subject (3) in Med. His., &c.: J. V. Forrest, M.B.

Passed in (*d*) ii, for promotion to the higher ranks :—

Major: J. E. Brogden, 86 per cent.

Captains: N. J. C. Rutherford, M.B., 75 per cent.; M. H. Babington, J. A. Anderson, M.B., 75 per cent.; E. T. Potts, M.D., J. B. G. Mulligan, 75 per cent.

Passed for promotion to the rank of Captain : In (*b*): A. N. R. McNeill, M.B. In (*h*) A. N. R. McNeill, M.B., 80 per cent.; H. H. Leeson. In (*h*) ii, C. McQueen. In (*h*) iii, C. McQueen. In (*d*) ii, A. N. R. McNeill, M.B., 75 per cent.

Note :—A. N. R. McNeill, M.B.; Special Certificate.

TENURE, &c., OF ROYAL ARMY MEDICAL CORPS APPOINTMENTS.

The following, which has been communicated by the Director-General, Army Medical Service, is published for general information.

The memorandum regarding the tenure, &c., of Royal Army Medical Corps appointments, published on p. 124, Journal of May, 1909, is cancelled and the following substituted :—

(1) (*a*) For three years, but which may be extended to five :—

Royal Hospital, Chelsea.
" " Kilmainham.
Duke of York's School.
Army Clothing Depot, Pimlico.
" D " Block, Netley.
Army Medical Stores, Woolwich and Dublin. (Q)
(Q) Quartermaster appointments.

(*b*) For four years :—

*Head Quarter Staff War Office.
*Royal Army Medical Corps School of Instruction, Commandant, Instructors and Assistant Instructor.
*Royal Army Medical College, Commandant, Professors and Assistant Professors.
Staff Officers to Principal Medical Officers.
Royal Military College, Sandhurst.
Royal Military Academy, Woolwich.
School of Musketry, Hythe.

(*c*) For three years :—

Members of Army Medical Advisory Board.
Senior Medical Officer, London Recruiting District.
Sanitary Officers.
Territorial Force—Staff Officers on active list and Adjutants.
Depot Aldershot. Adjutant and Company Officers.
Royal Arsenal, Woolwich.
Embarkation Medical Officer, Southampton.
Families Hospitals.
Families, Wellington, Marlborough and Stanhope Lines, Aldershot.
Registrars Royal Victoria Hospital, Netley, and Royal Herbert Hospital, Woolwich.

(2) The Director-General will nominate officers for the following charges, which are not, however, for fixed period† :—

(*a*) *Aldershot Command.*

Cambridge Hospital, also charge of Medical and Surgical Wards.
Connaught Hospital.

Eastern Command.

Canterbury Military Hospital.
Chatham " "
Colchester " "

* Tenure governed by Article 70 Royal Warrant for Pay.

† This new rule is rendered necessary in order to ensure an equitable working of the roster for field officers.

Hounslow Military Hospital.
Shorncliffe ,, ,,
Warley ,, ,,
Woolwich, Royal Herbert Hospital, also charge of Divisions.

Irish Command.
Belfast Military Hospital.
Cork ,, ,,
Curragh ,, ,,
Dublin—Arbor Hill Military Hospital.
Fermoy Military Hospital.

London District.
London, The Tower.
,, Queen Alexandra Military Hospital, also Staff.
,, Rochester Row Military Hospital, also Staff.

Northern Command.
Lichfield Military Hospital.
Newcastle-on-Tyne Military Hospital.
York Military Hospital.

Scottish Command.
Edinburgh Military Hospital.
Glasgow ,, ,

Southern Command.
Bulford Military Hospital.
Cosham ,, ,,
Devonport Military Hospital.
Netley—Royal Victoria Hospital, also charge of Divisions.
Tidworth Military Hospital.

Western Command.
Chester Military Hospital.
Pembroke Dock Military Hospital.

Jersey.
(*b*) All full pay recruiting appointments.
(*c*) All retired pay appointments

With regard to (*a*) officers who have been appointed to charges for a fixed term *prior* to March 1, 1911, will, as a rule, hold them for the period originally designated.

(3) Exchanges are permitted between Officers on the same roster, viz. —
(*a*) Lieutenant-Colonels.
(*b*) Majors.
(*c*) Captains.
(*d*) Quartermasters.

(4) An Officer who has returned to the United Kingdom on completion of a tour of foreign service will be required to serve a year at home before an exchange can be sanctioned.

PROMOTIONS.

SERJEANT-MAJORS.

10435	Qmr.-Serjt.	Huntingford, A. ..	18.2.11	*Vice* A. F. Tait, to H.M.Com.
9235	,,	Wickersham, J. ..	1.3.11	,, J. F. Ford to pension.
10259	,,	Higdon, F.	4.3.11	,, T E.McColgin to H M.Com.

STAFF-SERJEANT.

8700	Serjeant ..	Cudmore, F. W. ..	24.2.11	Special under para. 351, K.R

LANCE-CORPORALS.

19102	Private ..	Hughes, H. C. ..	9.3.11	Special under para. 281, S.O. R.A.M.C.
2285	,,	Walkley, T... ..	9.3.11	Special under para. 281, S.O. R.A.M.C.

DISCHARGES.

6760	S.-Major ..	Ford, J. F.	28.2.11	To pension.
10086	Qmr. Serjt.	Holding, A. W. ..	5.3.11	,,
7998	S.-Serjt. ..	Chase, W. B. ..	28.2.11	After 8 months' notice.
9908	,, ..	Pack, R. T... ..	7.3.11	After 18 years' service.
13314	Serjeant ..	Lochiel, D... ..	16.2.11	Medically unfit.
8696	,, ..	Wason, B. W. W...	19.2.11	Termination of second period.
7594	,, ..	Palmer, G. W. ..	7.3.11	After 3 months' notice.
8687	Corporal ..	Yendall, W. H. ..	12.2.11	Termination of second period.
8698	,, ..	Gander, A. E. ..	20.2.11	,, ,, ,,
10358	Lce.-Corpl.	Warren, F. C. ..	20.2.11	Medically unfit.
18748	Private ..	Cummings, W. ..	13.2.11	,, ,,
12327	,, ..	Rose, F.	17.2.11	,, ,,
18681	,, ..	Reid, G.	20.2.11	,, ,,
15432	,, ..	Moore, H.	11.3.11	,, ,,
96	,, ..	McMurdo, E. L. ..	7.3.11	On payment of £18.

TRANSFERS TO ARMY RESERVE.

1640	Pte.	King, W. ..	5.2.11	1699	Pte.	Jeffrey, R. H. ..	23.2.11
1686	,,	Carpenter, R. W.	17.2.11	18395	L.-Cpl.	Speller, C. A. J.	23.3.11
1674	,,	Townsend, G. ..	16.2.11	1705	Pte.	King, C. ..	26.2.11
1666	,,	Felstrad, E. ..	12.2.11	19004	,,	Mills, W. H. ..	26.2.11
1665	,,	Campbell, S. ..	12.2.11	1704	,,	Fletcher, J. ..	26.2 11
19116	,,	Dodghson, T. ..	13.2.11	18424	,,	Johnson, E.D.M.	27.2.11
18962	,,	Watts, E. ..	12.2.11	1703	,,	Breeds, W. ..	26.2.11
1642	,,	Jordan, E. ..	9.2.11	1709	,,	Steedman, F. A.	26.2.11
18353	,,	Pollen, A. E. ..	9.2.11	18406	,,	Butice, A. J. ..	25.2.11
1667	,,	Turner, C. W. ..	13.2.11	1714	,,	Blowers, W. ..	2.3.11
18387	,,	Daniels, W. ..	19.2.11	1722	,,	Coles, A. H. ..	2.3.11
1679	,,	Gray, A... ..	16.2.11	18419	,,	Apps, R. ..	1.3.11
1678	,,	Castle, A. H. ..	14.2.11	1724	,,	Jordan, C. ..	3.3.11
1672	,,	Hings, A. ..	16.2.11	1725	,,	Smith, T. C. ..	3.3.11
1687	,,	Clayfield, L. O.	18.2.11	1721	,,	Burnett, C. ..	1.3.11
1689	,,	Shields, H. ..	18.2.11	16941	,,	Thorne, W. ..	2.3.11
18378	,,	Manley, E. ..	15.2.11	1712	,,	Lloyd, F. B. ..	1.3.11
17176	,,	Wild, A. S. ..	18.2.11	1726	,,	Trimnell, C. J...	5.3.11
1683	,,	Holt, H. A. ..	19.2.11	1741	,,	Dolan, C. ..	8.3.11
1690	,,	Hargreaves, G...	21.2.11	18438	,,	Boyes, L. ..	6.3.11
1685	,,	Stott, W. ..	20.2.11	1742	,,	Darwin, I. ..	8.3 11
1691	,,	Dunne, J. ..	23.2.11	1730	,,	Jones, R. ..	6.3.11
1702	,,	Ranson, A. E. ..	25.2.11	1727	,,	Kell, B.	6.3.11
18407	,,	Farrell, J. ..	25.2.11	1744	,,	Lacey, N. G. ..	8.3.11
1684	,,	Wagstaff, E. W.	19.2.11	1729	,,	Short, W. ..	5.3.11
1718	,,	Lowe, L. W. ..	18.2.11	1283	,,	Simpson, R. ..	8 3.11
1693	,,	Marsh, S. H. ..	21.1.11	18434	,,	Smith, C. ..	5.3.11
1696	,,	Graves, A. E. ..	21.2.11	18452	,,	Stammers, G. H.	8.3.11
1694	,,	Marston, T. ..	20.2.11	18448	,,	Aldous, G. W. ..	8.3.11
18423	L.-Cpl.	Hanks, R. C. ..	22.2.11	18467	,,	Winter, W. ..	10.3.11
18404	Pte.	Freeman, M. ..	23.2.11	18461	,,	Clarke, H. ..	10.3.11
1698	,,	Joseph, I. ..	23.2.11	18474	,,	Kelly, C. ..	11 3.11
18388	,,	Binnington, E...	19.2.11	1749	,,	Plimmer, M. ..	9.3.11
1706	,,	Cryer, H. W. ..	23.2.11	1750	,,	Barron, P. ..	10.3.11
1841	,,	Fielding, S. E.	23.2,11	18462	,,	Johnson, F. ..	10.3.11
1720	,,	Knott, J. ..	24.2.11	1733	,,	Andrews, A. ..	8.3.11
1697	,,	Barry, D. ..	23.2.11	18444	L.-Cpl.	Hall, A. H. ..	5.3.11
1701	,,	Trebileo, A. J. ..	24.2.11	1745	Pte.	Longhurst, L. ..	8.3.11
18400	,,	Villiers, A. R. ..	23.2.11				

TRANSFERS FROM OTHER CORPS.

5806	Private ..	Marshall, H. C. ..	11.2.11	From 1st Btn. R. Fusiliers.

TRANSFERS TO OTHER CORPS.

17210	Serjeant ..	James, C. E. ..	1.3.11	To Territorial Force.

DEATH.

15174	Lce.-Corpl.	Forbes, A. J. ..	24.2.11	At Holywood.

EMBARKATIONS FOR ABROAD.

To MALTA, PER H.T. "DONGOLA," JANUARY 18, 1911.

18199	Lce.-Corpl.	Staff, A. H.	18428	Private ..	Bourne, F. J. J.
2029	Private ..	Robinson, F.	1551	,, ..	Richardson, P.
1799	,, ..	Stowe, S. A.	1653	,, ..	Russell, L.
1463	,, ..	Durrant, W. E.	18247	,, ..	Morrison, J.

PER H.T. "SOUDAN," FEBRUARY 25, 1911.

10619	Qmr.-Serjt.	Fitch, A.	18730	Private ..	Lester, F.

To GIBRALTAR, PER H.T. "PLASSY," FEBRUARY 8, 1911.

18153	Corporal ..	Beadle, E. C.	18331	Private ..	Waters, H.
1808	Private ..	McClay, W. J.	1425	,, ..	Evamy, W.
1764	,, ..	Seldon, H. W.	1752	,, ..	Fenn, E.
1638	,, ..	Smith, J.	2107	,, ..	Boorman, W. H.
1673	,, ..	Mitchell, A.	1611	,, ..	Hodson, P.
1617	,, ..	Eaton, C.	18860	,, ..	Worthington, J.
1478	,, ..	Cheater, H. C.			

To GIBRALTAR, PER S.S. "MOREA," FEBRUARY 24, 1911.

1659	Private ..	Regan, M.	1917	Private ..	Cooper, F.
1490	,, ..	Lansdowne, E. W.	1615	,, ..	Paddison, J. R.
1754	,, ..	Card, W. F.			

To SIERRA LEONE, PER S.S. "BATHURST," FEBRUARY 9, 1911.

11700	Serjeant ..	Stroud, M.	16560	Private ..	Magee, W. A.
10820	,, ..	Pearson, J.	288	,, ..	Sheehan, J. D.
12651	Corporal ..	Bennett, R. H.	19079	,, ..	Stoneham, E. G.

To EGYPT, PER H.T. "SOUDAN," FEBRUARY 25, 1911.

9579	S.-Major ..	Houston, C. F.	1759	Private ..	Meenagh, J. H.
18259	Lce.-Corpl.	Roden, W. T.	1998	,, ..	Passingham, E. G.
18318	,,	Thomas, E. G.	1620	,, ..	Pegg, A. E.
1985	Private ..	Brown, R. H.	1509	,, ..	Warren, A.
1656	,, ..	Chivers, A. H.	2069	,, ..	Welby, H.
1600	,, ..	Godden, F. J. H.			

DISEMBARKATIONS FROM ABROAD.

FROM S. AFRICA PER H.T. "ROHILLA," FEBRUARY 1, 1911.

8223	S.-Major ..	How, S. J.	18658	Private ..	Gardner, E. R.
7553	,, ..	Rapson, J. M.	19052	,, ..	Gray, S. E.
10021	,, ..	Ward, H. A.	19198	,, ..	Harper, F. T.
9800	,, ..	Renton, W. C.	19896	,, ..	Rutt, C. W.
11123	Qmr.-Serjt.	Polhill, H. T.	19697	,, ..	Rhodes, F.
12932	S.-Serjt. ..	Gordon, C.	19110	,, ..	Smith, C. H.
18149	Serjeant ..	Godfrey, A. H.	19628	,, .	Stabler, J.
18216	,, ..	Leggett, R. G.	19648	,, ..	Stirling, F.
15288	Lce.-Serjt.	Wrigglesworth, J. T	19997	,, ..	Tilby, R. J.
18760	Private ..	Boyd, C. J.	681	,, ..	Tyrrell, H.
19665	,, ..	Boxall, H. G.	19789	,, ..	Wallis, F.
19280	,, ..	Clarke, E.			

PER H.T. "SOUDAN," FEBRUARY 15, 1911.

9620	Serjeant ..	Crowther, J.	10070	Corporal ..	Parrott, A.
15001	,, ..	Hurst, W.	11582	S.-Serjt. ..	Ryan, J.
12376	Corporal ..	Walsh, J. B.	17234	Serjeant ..	Jones, W.
19254	Private ..	Scales, G. A.	17857	,, ..	Macklin, A. E.
19854	,, ..	Allison, J.	18507	Lce.-Corpl.	Gerrie, W. A.
19812	,, ..	Barron, F. P.	2200	Private ..	Preece, A.
19022	,, ..	Birmingham, P.			

FROM GIBRALTAR, PER H.T. "SOUDAN," FEBRUARY 15, 1911.

17870	Corporal ..	Cragg, F.	19566	Private ..	Dowers, F. G.
15289	,, ..	Rodman, H. R. M.	19501	,, ..	Hahner, W.
17787	,, ..	Whyatt, A. H.	19515	,, ..	Salter, J. D.
19261	Private ..	Croft, A. T.	19528	,, ..	Stiiff, F. A.

FROM SIERRA LEONE, PER S.S. "MENDI," FEBRUARY 20, 1911.

16325	Corporal ..	Gibbs, A. F.			

THE FOLLOWING N.C.O.'S AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS.

FOR QUARTERMASTER-SERJEANT.

11724	S.-Serjt. ..	Maxwell, G. M.	11509	S.-Serjt. ..	Earp, J. J.
11441	,, ..	Sprinks, H.	14290	,, ..	Scott-Badcock, W. H.

FOR STAFF-SERJEANT.

8791	Serjeant ..	Jewell, V. E.	11583	Serjeant ..	McCarthy, W.
11523	,, ..	Shaw, H.	12261	,, ..	Green, J. E.

FOR SERJEANT.

17485	Lce.-Serjt.	Kennedy, H.	13921	Corporal ..	Cooper, J. W.
17091	Corporal ..	Moore, J.	18816	,, ..	Bond, G. W.
19966	,, ..	Chatten, G. V.	19595	,, ..	Bull, C. E.
16982	,, ..	Medland, J.			

FOR CORPORAL.

109	Private ..	Emment, A. G.	17899	Private ..	Dyke, W. E.
1102	,, ..	Hake, J. G.	18860	,, ..	Worthington, J.
1643	,, ..	Mattock, F. H.	1973	,, ..	Elliott, W.
1118	,, ..	Reeves, H. W.	2198	,, ..	Duggan, G. H. W.
4473	,, ..	Buckeridge, G.	954	,, ..	Hallett, H. C.

QUALIFIED AS DISPENSERS.

12185	Corporal ..	Willis, A. S.	19079	Private ..	Stoneham, E. G.
13555	,, ..	Allen, W. J.	11908	Corporal ..	Prior, A.
17868	,, ..	Skennell, J. E.	16130	,, ..	Lacey, W.
19102	Private ..	Hughes, H. C.	2235	Private ..	Walkley, T.
17825	Corporal ..	Moore, N.	18332	Corporal ..	Bevan, B. B.
12802	,, ..	Whyte, W.	19048	Private ..	Black, J.
11276	,, ..	Darker, J. G.	1082	,, ..	Mean, E.
14334	,, ..	Rose, S.	18509	Lce.-Corpl.	McFarland, J.
18170	,, ..	Sufrin, L.	19802	Private ..	Leakey, A.
19200	Private ..	Ballantine, J.			

NOTES FROM ALDERSHOT.—Serjeant-Major Roberts writes:—

"OFFICERS' CLUB CONCERT, BY ROYAL ARMY MEDICAL CORPS' BAND.

"Lovers of good music had an opportunity for enjoyment at the Officers' Club on Tuesday afternoon, on the occasion of the concert given by the string band of the Royal Army Medical Corps, by permission of Surgeon-General Sir T. J. Gallwey, K.C.M.G., C.B., M.D., and officers of the Corps. There was a very large audience, the ball-room being comfortably filled; and those present listened with evident appreciation to the really excellent programme given, and showed their appreciation in a manner that was not in any way half-hearted. Under the able conductorship of Mr. Geo. Pringle Robertson, the talented bandmaster, the band won for itself fresh laurels; and to say that the success of the band was a success for Mr. Robertson is not putting his work at too high a value. Their opening overture, Bouillon's 'Loin du pays,' an excellent example of the light overture, was given with that artistic expression which so distinguishes a clever combination. A symphony in D minor, by Schubert, gave great enjoyment to music-lovers, and then followed two delightful pieces by Raff and Rubinstein—respectively, Cavatina, and Melody in F. The works of these famous composers were given in a manner which left nothing to be desired, and their execution showed how perfectly balanced was the band. 'The Military Symphony' (Haydn) gave intense pleasure to everyone present, and was received with rapturous applause. The succeeding item, the Valse Triste, from the drama 'Kuslema' (Sibelius), was one of the best items in the whole programme. It is a number from the incidental music to a drama written by the composer's brother-in-law, entitled 'Kuslema' (Death), and is one of the most popular of the Finnish master's lesser compositions. It was interpreted with a sympathetic expression and understanding of the yearning and shuddering sadness of the music, which held the audience spell-bound until the last faint notes died away almost inaudibly. The final item, the suite from the 'Ballet Egyptien' (Luigini), was given by desire, and was a really fine effort. Of the soloists, Miss Ross met with great success. At her first appearance she sang 'O my garden full of roses' (Coningsby Clarke), with inexpressible sweetness and charm, and she won enthusiastic applause from her hearers, who listened with equal pleasure to 'The Rosery,' which she gave as an encore. Later she gave a very sympathetic rendering of 'Beloved, it is morn' (Florence Aylward). Mr. Roland Jackson, the possessor of a very fine tenor voice, achieved an immediate success with 'Marie, my girl' (G. Aitken), which was enthusiastically applauded, and in response to an unmistakable encore he contributed 'Tis the day,' a number which admirably brought out the infinite range of his voice. In his subsequent appearance he contributed two freebooter songs. 'Son of Mine' was a fine effort, but 'The Rebel' was even finer, and again he had to respond to the enthusiastic plaudits of his hearers. On this occasion he gave 'I'll sing thee songs of Araby' in most delightful style. Captain J. S. Bostock, R.A.M.C., an excellent baritone, gave a splendid rendering of Hermann Lohr's 'A Song of Surrey'—an effort which led the audience to hope that more would be forthcoming, but in this they were disappointed. Corporal Morfitt, R.A.M.C., was in admirable form. His fine bass voice he used with splendid judgment in 'The Roses' (Stephen Adams), which gave great pleasure, and received a hearty encore, in response to which he sang 'Two Eyes of Grey' in an equally clever manner.

"A most interesting lecture by Surgeon-General G. J. H. Evatt, M.D., C.B., was delivered in the well-appointed Army Service Corps Theatre here on February 23; the subject, 'Army Origins, Traditions, and Folklore.'

"Quartermaster and Honorary Lieutenant A. F. Tait, R.A.M.C., has been posted

to the Cambridge Hospital; Serjeant-Major C. A. Kay has been posted to Edinburgh for duty; and Serjeant-Major S. How to Grosvenor Road for duty.

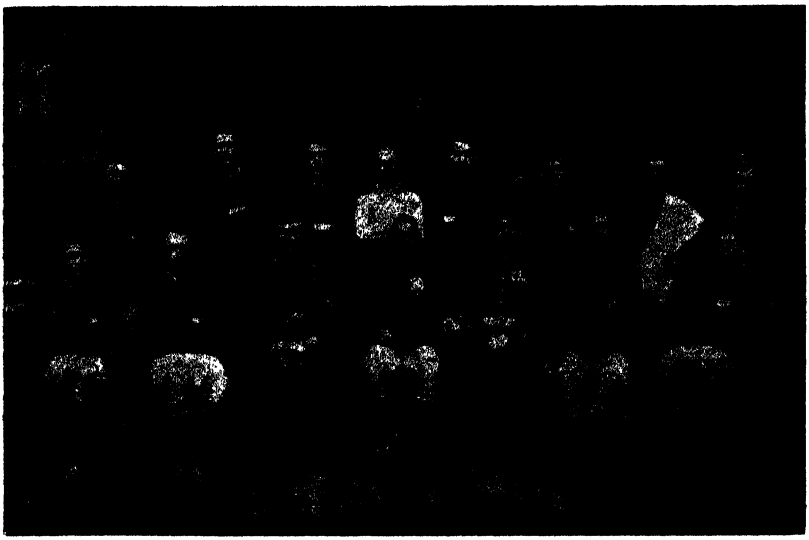
"Quartermaster-Serjeant J. Wickersham, R.A.M.C., recently promoted to Warrant Rank, has proceeded to Woolwich for duty.

"Serjeant-Major Wickersham, who has served at the Connaught Hospital for the past eight years, leaves with the good wishes of all for his future welfare; prior to leaving he was presented with a souvenir from his comrades.

"THE HARRIERS' CLUB.

"On Tuesday the Harriers held their eight-mile race for the Club championship. With Elsey, Prince, Mack, Jepp, Reeves, and Bull (all members of the Surrey Athletic Club) standing down, only eleven turned out. These ran over the course that, beginning and finishing on the square, touched Jubilee Hill, the racecourse, the Foresters', Norris Bridge, Ball Hill, and Cove Reservoir; Smith making the pace, kept the lead to half way across the Valley, with Skipper and Barker at his heels. At the racecourse Smith had given way to Skipper, who held the lead until within a hundred yards or so of Norris Bridge, where he fell and injured himself so badly that he was carried back to barracks. The accident made Smith's chance sure, as he demonstrated by running home an easy winner two and half minutes ahead of the next man. The order of finishing was as follows: (1) Smith, 40 min. 30 sec.; (2) Barker, 42 min. 30 sec.; (3) Button, 45 min. 25 sec.: (4) Rodgers, 49 min. 20 sec.; (5) Steer, 49 min. 30 sec.; (6) Evans, 53 min.; (7) Turner, 53 min. 10 sec.; (8) Collier, 53 min. 10⅘th sec. Reed and Penson did not finish. Staff-Serjeant Merchant acted as starter and judge, and was assisted in the latter office by Serjeant Suter; Corporal Bull was timekeeper, and Private Elsey recorder. The point judges were Serjeant Cairns, Corporal Porter, Lance-Corporal Jack, and Privates Barlow, Dodson, and Dell."

NOTES FROM EDINBURGH.—Staff-Serjeant Badcock writes: "On March 1 a very successful smoking concert was held at the Union Hotel, Edinburgh, to bid farewell to Serjeant-Major W. E. Hill, R.A.M.C., who left on March 3, for two months



Pte. Mann. Cpl. McArthur. Cpl. Moore. Pte. Godfrey. Pte. Muir. Pte. Thompson. Pte. Rote. Pte. Aley. (Sec.)
Pte. Freeman. S.-Sjt. Scott-Badcock (Vice-Capt.). Lt.-Col. F. S. Heuston, C.M.G. Sjt. A. G. Ray (Capt.). S.-Mjr. Hill. Pte. Kilyen. Pte. Pirret.

furlough pending discharge to pension. Staff-Serjeant Ashton presided, and a number of representatives from out-stations were present. Staff-Serjeant Ashton, in asking all present to drink to the health and success of Serjeant-Major Hill, expressed in a few

well chosen words the high esteem in which he is held by all ranks, wished him every success in his future life, and asked him to accept on behalf of the Company a small token, at the same time expressing the regret of one and all that the time had come for him to sever his connection with the Service.

"The toast was given with musical honours, Serjeant-Major Hill afterwards suitably replying.

"The proceedings were enlivened by a concert which was greatly enjoyed by all, a great deal of unexpected talent being brought to light.

"Serjeant-Major Kay joined the Company on March 10 for duty, on his return from Jamaica.

"The Detachment Football team, emboldened by their previous successes, have entered a recently-formed league (The Edinburgh and Leith Wednesday League). The first match was played on March 1, *v.* The Leith Police, and resulted in a very creditable draw of 1 goal each. The second match, on March 8, *v.* Leath Shop Assistants, resulted in a win for our opponents (5—2), despite the fact that the Corps were leading 2—1 at half time. Under the kindly care of our Company Officer Captain Arthur, our team should finish very near at the top of the league.

NOTES FROM MALTA.—Serjeant-Major Collard writes under date: "I send an account of the last match of the Garrison League, Malta, also the League position table.

"Garrison Football League.

"The last match but one was played at the Marsa yesterday between the Argylls and the R.A.M.C.

"Play commenced at 3 o'clock with a series of attacks by the Argylls who looked at first as though they would carry all before them. They had the advantage of the wind and made the most of it. A foul against Campbell removed the pressure and the R.A.M.C. worked towards the Canteen goal where Richardson tried Robb, but he thumped the ball away. Duffie speeded it further ahead and W. Beattie passed out to Campbell, but when the latter centred it again A Beattie shot wide of goal. A. Beattie had another opening shortly afterwards, but Hutchings frustrated a good chance and returned the ball well up the field, but though it was well helped forward the "gentleman with the white cap" stumbled and lost a chance. The Argylls took the ball away again and for the next twenty minutes did all the attacking; they met with a sturdy resistance from the defence of the R.A.M.C. and in consequence were not able to score, although Campbell made some very good centres; when the backs were beaten Sayers was always there as a last resource. During the last quarter of an hour Campbell gave at least three centres but 'W' and 'A' must have had new boots on for they could not find the goal (*how Mahon is missed*). Then Campbell tried himself but he met with no better luck. Just before the time the R.A.M.C. got over and the ball coming from Turner to Whittaker the latter forced Robb to save for the second time.

"The interval then arrived, and the 30th Company R.A.M.C., though not having scored themselves, had kept the Argylls from scoring.

"The XCIst started again but Whittaker speedily got ahead and gave an oblique shot to Robb—it went over his head and skimmed the crossbar. Back and forward went the ball for five minutes and then a double attack was made on Robb; the first from Lewis was safely negotiated, but in a twinkling it was back again from Richardson who managed to evade him and open the score for the R.A.M.C.

"This brought some *vim* into the game and smart play was witnessed during the next quarter of an hour. W. Beattie and Campbell led some beautiful attacks, but the R.A.M.C. defence worried them so much that their final shots were all off—they could find any place except the goal. It was a long time before the R.A.M.C. got beyond the the half line. but at last Whittaker forced a corner but the wind carried the ball behind.

"Nothing further was scored and the result was—

Argylls	Nil
R.A.M.C.	1 goal

"Campbell, King and Duffie played well for the XCIst, who generally did most of the attacking.

"Sayers, Talbot, Hutchings, Tipping, Thain and Richardson worked hard for the winners.

"The match attracted a large number of spectators and was refereed by Company Serjeant-Major Taggert, R.A., the linesmen being provided by the Royal Garrison Artillery West.

GARRISON FOOTBALL LEAGUE TABLE.

Final Positions.

	Played	Won	Drawn	Lost	Goals For	Goals Agst.	Average	Points
R.G.A. West ..	8	7	0	1	25	5	5·0	15
Argylls	8	5	2	1	21	8	2·62	11
R.G.A. Central ..	8	4	1	3	18	8	2·25	11
R.A.M.C.	8	5	2	1	12	11	1·09	11
Devons	8	4	2	2	13	9	1·44	10
R.E.	8	2	5	1	11	17	0·64	5
R.G.A. East.. ..	8	2	6	0	11	27	0·40	4
Somersets	8	1	6	1	10	17	0·58	3
Gloucesters	8	1	7	0	11	30	0·36	2

"The performance throughout the League matches has been considerably beyond the average in past years, and the position gained beats all previous records, considering we have only about 170 of all ranks from which to pick a team as compared with regiments, &c.

"Whitaker stands foremost in goal scoring (4), Lance-Corporals Hutchings (2), Dugmore (1), Corporals Pollock (1), Tipping (1), Taylor (1), Lance-Corporals Lewis (1), Richardson (1).

"The team always appear to be at home in League football, but cannot get going in cup ties, with the result that the Corps lost to R.G.A. Central 2 to nil in the Governor's Cup.

"The Detachment Serjeants' Mess, Valletta, opened their New Mess on February 24, and marked the occasion by a smoking concert, Serjeant-Major Dudman presiding, all regiments and corps being represented, and a very enjoyable evening was spent.

PROGRAMME.

PART I.

1. Pianist Pte. MCCARTHY, A.S.C.
2. *Song* 'The Flight of Ages' .. Serjt. KIRBY, R.A.M.C.
3. *Song (Comic)* 'Killaloo' Mr. KAINE
4. *Song* 'Love me and the world is mine' Serjt. BLAIR, R.A.M.C.
5. *Violin Solo* 'La Seranata' Bdman. BENNETT, 2nd Northants
6. *Song* 'A Soldier's Song' Staff-Serjt. ANDERSON, A.P.C.
7. *Song (Comic)* 'Setting the Village on Fire' Serjt. VANN, A.S.C.
8. *Song* 'I hear you calling me' Serjt.-Maj. COLLARD, R.A.M.C.
9. *Song (Comic)* 'I Love a Lassie' Qrtrmr.-Sjt GILLESPIE, R.A.M.C.
10. *Song* 'Our Daily Bread' C.P.O. HAWES, R.N.

Interval.

PART II.

11. *Song* 'The Bassoon' Pte. MCCARTHY, A.S.C.
12. *Song (Comic)* 'Finnegan's Wake' Mr. KAINE.
13. *Song* 'The Holy City' .. Staff-Serjt. MCLEOD, A.S.C.
14. *Song (Comic)* 'Killiecrankie' Qrtrmr.-Sjt. GILLESPIE, R.A.M.C.
15. *Conjuring* Mr. Gr. ROWE, R.G.A.
16. *Song* 'Thora' C.P.O. HAWES, R.N.
17. *Song (Comic)* Selected Col.Sjt. MATTHEWS, A. & S. Highldrs.
18. *Song* 'Wert thou a Slave' Sjt.-Maj. COLLARD, R.A.M.C.
19. *Song (Comic)* 'I looked out of the window' Qrtrmr. BALDWIN, R.G.A.
20. *Song* 'A Skipper' .. Staff-Serjt. ANDERSON, A.P.C.

'GOD SAVE THE KING.'

"The rooms have been tastefully decorated and furnished in a manner worthy of a Serjeants' Mess. Many of the old Malta Company will be delighted to hear of these improvements.

"At Cottonera (Headquarters) the Zabbar barrack room, regimental institute, ablution rooms, &c., have recently been fitted with electric light, replacing paraffin lamps, and consequently lessening the barrack damages.

"Serjeant-Major Huntingford, on promotion, is retained at Imtarfa Hospital for duty

"*Arrivals.*—H.T. 'Soudan': Major H. S. Thurston, posted to Valletta for duty; Sister Miss E. Foster, Q.A.I.M.N.S., 10619 Quartermaster-Serjeant A. Fitch and family, 18790 Private Tester, to Headquarters, Cottonera.

"*Departures.*—H.T. 'Dongola': Captain T. H. Gibbon left England on the 8th instant.

NOTES FROM SIMLA.—Lieutenant-Colonel R. S. F. Henderson, V.H.S., R.A.M.C., Secretary to Principal Medical Officer, His Majesty's Forces in India, writes as follows, dated February 16, 1911: -

"*Appointments.*- Majors J. Girvin and W. Hallaran, R.A.M.C., have been appointed to the command of the Station Hospitals, Ahmednagar and Jhansi respectively.

Major D. D. Shanahan, R.A.M.C., has been appointed Staff Officer for Medical Mobilisation Stores, 9th (Secunderabad) Division, with effect from January 1, 1911.

"Major D. Harvey, R.A.M.C., will be in medical charge of the 10th Transport 'Rewa' sailing from Karachi on March 31, 1911.

"*Leave.*—The grant of leave to the undermentioned officers has been concurred in: Major S. W. Sweetnam, R.A.M.C., general leave for six months from April 1, 1911; Captain J. du P. Langrishe, R.A.M.C., general leave for six months from April 1, 1911; Lieutenant-Colonel S. R. Wills, R.A.M.C., leave on private affairs for eight months from February 15, 1911; Captain C. R. M. Morris, R.A.M.C., general leave for seven months, from February 1, 1911; Captain A. Scott-Williams, R.A.M.C., general leave for eight months, from March, 1911; Major D. Harvey, R.A.M.C., general leave for eight months, from March, 1911; Captain J. A. Bennett, R.A.M.C., leave on private affairs for six months, from March 1, 1911; Lieutenant-Colonel M. O'D. Braddell, R.A.M.C., has been granted six months' leave on medical certificate.

"*Postings.*—On arrival from England the undermentioned officers will be posted to the Divisions shown against them; Major J. McD. McCarthy, R.A.M.C. 5th (Mhow) Division; Captain A. C. Duffey, R.A.M.C., 2nd (Rawalpindi) Division.

"*Specialists.*—The following officers have been appointed specialists and posted to the Divisions shown against them: Major B. Watts, R.A.M.C., Midwifery and Diseases of Women and Children, 7th (Meerut) Division; Major J. G. S. Archer, R.A.M.C., Advanced Operative Surgery, Burma Division; Captain H. F. Shea, R.A.M.C. Advanced Operative Surgery, 8th (Lucknow) Division, during the absence on leave of Major Gunter, R.A.M.C., Captain W. R. P Goodwin, R.A.M.C., Ophthalmology, 1st (Peshawar) Division.

"The orders appointing Captain A. C. Duffey to the 1st (Peshawar) Division as specialist in Midwifery and Diseases of Women and Children have been cancelled."

NOTES FROM CEYLON.—Major F. A. Symons writes: "Ceylon, as a rule, has little to report that would be of interest to more than a very few readers of the 'Journal.' This year, however, as four out of the five officers serving in the island are due for relief, its affairs will, no doubt, become of paramount importance. There are four live stations in Ceylon and one dead one

"At Colombo there is a large hospital (recently cut down to thirty beds) occupying a beautiful position on the Galle Face, looking upon the open Indian Ocean. Here resides the Staff Medical Officer, Lieutenant-Colonel N. Manders. In times of peace, Major MacDougall (Sanitary Specialist), and Lieutenant Worthington do duty at this hospital. The laboratory annexed is a good one, and here is performed the indoor sanitary and research work of the Command.

"The troops at Colombo consist of one company of Garrison Artillery, half a hundred Royal Engineers, Royal Army Medical Corps, and details. To the deep grief of the inhabitants there is no British Regiment, and consequently no British band. The 98th Indian Infantry now occupy the old British barracks. Colombo is supposed to be hot, but there is always a strong sea breeze. Punkahs are almost unknown, and on the sea front, where the messes and quarters lie, even electric fans are seldom used. It is certainly the coolest 'hot' station I have yet struck.

"Kandy, about three hours by train inland from Colombo, was once the happy resting ground of British troops. It now boasts of a Detention Barracks, a wing of the 98th Infantry, and a one-bedded hospital. Here, Captain Carruthers, R.A.M.C., holds command—always as Medical Officer, and in times of stress as Officer Commanding Detention Barracks. It will be remembered that this Officer on his way out to Ceylon, per P. and O. passenger ship, performed a laparotomy on board ship and saved his

patient. His skill as a surgeon is making his presence in the Kandy district well known and much valued by civilians as well as by military. Kandy is warm by day, but always cool by night. As regards recreation, its joys are few. Its troubles are, however, equally scarce.

"Nuwara Eliya is the health resort of Ceylon, and is rapidly becoming that of Burma and the Straits also. It is a great relief to the weary Colombo people to feel that, after dinner in Colombo, they may board the train at 10 p.m., turn into a first-class sleeping-carriage, and find themselves at 8.15 a.m., in a thick greatcoat at Nuwara Eliya. Here the Convalescent Depot is situated, and here also the General and Governor have official residences (as well as Colombo), and reside for as many months in the year as their duties will permit.

"The station lies in a valley, overshadowed by hills, covered with jungle and tea estates, 6,200 feet above sea level. Its natural beauties have been described *ad nauseam*. The climate is beautifully fine from about January to May. From June to September it rains, until one's soul cries out for succour. From October to January the weather consists of samples, mostly wet. There are 100 inches of rain in the year, spread over two hundred days. In December last it rained 11 inches of rain in one day a few miles from Nuwara Eliya.

"The Convalescent Depot is under the Command of Major F. A. Symons, R.A.M.C., and consists of barracks, accommodating seventy men, a hospital, a small house for the Medical Officer, and a larger one for the D.A.A. and Q.M.G. The hospital contains six beds, and an infectious block of two beds is nearly built. From February to June the barracks are filled with British troops, who arrive in batches from Colombo for change of air. Last year ten convalescents from Singapore were sent here; these benefited so greatly, that another lot are to come this year. The Depot is now open all the year round.

"Nuwara Eliya possesses the best golf course in the East. I venture to state that it would also hold its own in England. The variations of temperature at this time of the year during the twenty-four hours are very great, the thermometer ranging from about 80° to 30° F.

"Diyatalawa Camp is, as the crow flies, about a dozen miles from Nuwara Eliya, but by train the journey takes three hours.

"This is the site of the old Boer prisoners' camp. It lies in the open country amongst grass-covered hills, and is as like portions of the Natal veldt as one place could be like another. About 200 Boers lie buried in the little cemetery, each with his neat memorial cross. Opposite these lie the remains of the British troops who died during the time of their guardianship. This camp is opened on March 1 and is not shut until the end of June. The men from Nuwara Eliya pass on here in turn, and there meet others from Colombo; also the native regiment comes here for training. Here also in May, the Ceylon Volunteers assemble for their annual training. The married families and children also, who cannot find room at Nuwara Eliya, are sent here from Colombo for the hot months. The Navy have a barracks here for change of air. After chasing gun-runners in the Persian Gulf they find it a perfect heaven. The climate is warmer than Nuwara Eliya, the station being some 2,000 feet lower.

"Major A. J. MacDougall, R.A.M.C., generally finds himself at the camp each year, both as Medical Officer and Sanitary Officer. Various swamps have been drained under his supervision.

"Now we come to the dead station—Trincomalee. It has been dismantled of its guns. Its two forts, in grim desolation, look silently upon as fine a view of the sea as Nature can produce. The well built hospital, the officers' mess, the quarters lie empty. The beautiful harbour, crying out for sailing boats, recalls many memories of the past. This was, I hear, quite the favourite station in the island.

"It was the privilege of the writer last month to be a member of a staff ride, in which seven motors filled with zealous officers fought battles galore all along the road from Kandy to Trincomalee. There is no railway, the road running in many places through virgin jungle. The sport of the island lies in this direction, and the rest houses are good. Estates of rubber, coffee, cocoa, and tea lie on the Kandy side, then comes the jungle, and last, that glorious vista of harbour and sea—Trincomalee.

"The Navy still spends some months yearly at Trincomalee, but from the most recent reports, it is dead as a military station. Its revival, the return of a British regiment to Ceylon and a fresh rubber boom, are the three hopes which keep the country together.

"Lieutenant-Colonel Manders, whilst on leave at Coonoor, won the open doubles at tennis. Major Symons managed to be defeated in the finals for the Captains' Cup at Nuwara Eliya in the big Easter Golf Tournament.

"For the football team of the Staff and Departmental Sports Club (*i.e.*, R.A.M.C., A.S.C., and A.O.C., total membership about twenty-two), Private Browne, R.A.M.C., scored 10 goals (no higher record), and Private Dean, R.A.M.C., 6, during the season.

"The following also played in the various football matches: Serjeants Primer, Skinner; Corporal Harris, Privates Vyse, Killigrew, Malone, Godsell, Fullbrook, and Brunt. Of a total membership of 14 for the R.A.M.C., 56 players have represented the Club during the season.

"At hockey, Corporal Harris scored for the Staff and Departmental Sports Club three times, and during the season the following also played: Privates Brown, Brunt, Dean, Fullbrook, and Vyse.

"The cricket record shows four matches having been played. Wickets taken: Corporal Harris, 4; Private Browne, 3; Private Vyse, 8. Catches: Private Vyse, 2; Corporal Harris, Privates Browne and Rowe one each.

SPECIAL RESERVE.

Royal Army Medical Corps.

The undermentioned Lieutenants have been confirmed in their rank: James B. Williamson, M.B.; Claude Johnson, M.B.; John Adams, M.B.; David T. M. Large, M.B.; David T. Richardson, M.B.; William L. Webster, M.B.; Frederick W. Lumsden, M.B.

To be Lieutenant (on probation) Laurence Melville Routh, dated February 6, 1911.

TERRITORIAL FORCE.

Royal Field Artillery.

1*st South Midland* (*Gloucestershire*) *Brigade, Royal Field Artillery.*—Surgeon-Captain James R. Bibby, M.B., resigns his commission, dated February 25, 1911.

Royal Army Medical Corps.

2*nd East Lancashire Field Ambulance, Royal Army Medical Corps.*—William James Purves to be Lieutenant, dated December 21, 1910.

2*nd South Midland Field Ambulance, Royal Army Medical Corps.*—Lieutenant-Colonel Charles T. Griffiths reverts at his own request to the rank of Major, dated February 15, 1911.

Major Charles T. Griffiths resigns his commission, dated February 15, 1911.

2*nd Highland Field Ambulance, Royal Army Medical Corps.*—Major Alexander Ogston, M.B., from the 1st Highland Field Ambulance, Royal Army Medical Corps, to be Major, dated May 22, 1910.

2*nd London* (*City of London*) *Field Ambulance, Royal Army Medical Corps.*—Frederick Morres to be Lieutenant, dated 10, 1910.

1*st Lowland Field Ambulance, Royal Army Medical Corps.*—Lieutenant Ernest A. Boxer resigns his commission, dated February 18, 1911.

1*st Northumberland Field Ambulance, Royal Army Medical Corps.*—Lieutenant Frederick G. Armstrong resigns his commission, dated February 18, 1911.

2*nd Home Counties Field Ambulance, Royal Army Medical Corps.*—Lieutenant Edwin A. Houchin is restored to the establishment, dated December 15, 1910.

5*th London Field Ambulance, Royal Army Medical Corps.*—Lieutenant Robert Corfe to be Captain, dated December 1, 1910.

3*rd Northumberland Field Ambulance, Royal Army Medical Corps.*—August Frederick Perl, M.B., to be Lieutenant, dated January 14, 1911.

3*rd London* (*City of London*) *Field Ambulance, Royal Army Medical Corps.*—Lieutenant Harold A. T. Fairbank, F.R.C.S., to be Captain, dated August 30, 1910.

1*st Scottish General Hospital, Royal Army Medical Corps.*—The undermentioned officers retire under the provisions of paragraph 75 of the Territorial Force Regulations, dated February 25, 1911. Lieutenant-Colonel John Gordon, M.D. Major George Rose, M.B.

South Wales Mounted Brigade Field Ambulance, Royal Army Medical Corps.—Major John R. I. Raywood to be Lieutenant-Colonel, dated December 8, 1910.

Welsh Border Mounted Brigade Field Ambulance, Royal Army Medical Corps.—Lieutenant George Jubb, M.B., resigns his commission, dated March 4, 1911.

1st Lowland Field Ambulance, Royal Army Medical Corps.—William Ferguson Mackenzie, M.B., to be Lieutenant, dated February 18, 1911.

2nd Lowland Field Ambulance, Royal Army Medical Corps. -Dugald Henry MacPhail, M.B., to be Lieutenant, dated January 4, 1911.

1st South Western Mounted Brigade Field Ambulance, Royal Army Medical Corps.—Captain Samuel Maclean, M.B., from the List of Officers attached to Units other than Medical Units to be Captain, dated December 28, 1910.

2nd South Midland Field Ambulance, Royal Army Medical Corps.—Captain Seymour Gilbert Barling, from the 1st South Midland Field Ambulance, Royal Army Medical Corps, to be Major, dated March 11, 1911.

Captain George William Craig, from the 1st South Midland Field Ambulance, Royal Army Medical Corps, to be Captain, dated March 11, 1911.

Officers attached to other Units.

Major Alfred C. Tunstall, M.D , is retired, under the conditions of paragraph 116, Territorial Force Regulations, and is granted permission to retain his rank and to wear the prescribed uniform, dated February 15, 1911.

William Lang Hodge to be Lieutenant, dated December 15, 1910.

Dudley Raymond Harris, M.D., to be Lieutenant, dated January 7, 1911.

Lieutenant Wilfred E. Alderson, M.D., to be Captain, dated October 26, 1910.

Lieutenant Frederick K. Smith, M.B., to be Captain, dated November 1, 1910.

Lieutenant-Colonel Duncan W. Currie, M.B., resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated February 18, 1911.

Major James A. Rigby, M.D., resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated February 22, 1911.

Major John Alfred Masters, M.D., from the 2nd London (City of London) Field mbulance, Royal Army Medical Corps, to be Major, dated January 23, 1911.

Lieutenant Alan, L.S., Tuke, M.B., to be Captain, dated December 10, 1910.

Lieutenant-Colonel Charles C. Greig, M.B., retires under the provisions of paragraph 116 of the Territoral Force Regulations, and is granted permission to retain his rank and to wear the prescribed uniform, dated February 25, 1911.

Lieutenant Edward Oliphant, M.B., resigns his commission, dated February 25, 1911.

Major George Williamson, M.B., resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated March 8, 1911.

Lieutenant Alfred H. Godwin resigns his commission, dated March 8, 1911.

For attachment to Units other than Medical Units.

Norman Mello Ferguson, M. B., to be Lieutenant, dated January 15, 1911.

1st South Western Mounted Brigade Field Ambulance, Royal Army Medical Corps.

Captain Samuel Maclean, M.B., from the List of Officers attached to Units other than Medical Units, to be Captain, dated December 28, 1910.

2nd South Midland Field Ambulance, Royal Army Medical Corps. Captain Seymour Gilbert Barling, from the 1st South Midland Field Ambulance, Royal Army Medical Corps, to be Major, dated March 11, 1911.

Captain George William Craig, from the 1st South Midland Field Ambulance, Royal Army Medical Corps, to be Captain, dated March 11, 1911.

VOLUNTEERS.

INFANTRY.

1st Volunteer Battalion, The Prince of Wales (South Lancashire) Regiment.—Surgeon-Captain Wilfred Curtis, not having signified his wish to join the Territorial Force, is struck off the strength, dated March 31, 1908.

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

The following ladies have received appointments as Staff Nurse: Miss V. L. W. Bird, Miss A. Bradley, Miss C. V. E. Thompson.

Postings and Transfers.—Matrons: Miss E. A. Cox, to Bloemfontein, on arrival in South Africa; Miss M. L. Rannie, to Netley, from Dublin; Sisters: Miss E. Foster, to Malta, from Netley; Staff Nurses: Miss G. H. Sellar, to Egypt, from Curragh; Miss K. F. G. Skinner, to Egypt from Curragh; Miss C. Macrae to Gibraltar, from York; Miss M. Jackson, to London, S.W., from Dublin; Miss S. W. Wooler, to Netley, from Colchester; Miss G. H. Caulfeild, to Curragh, from Connaught Hospital, Aldershot; Miss A. R. Sibbald, to Bloemfontien, from Wynberg; Miss M. A. Lovett, to Wynberg, from Pretoria; Miss M. M. A. McCreery, to Bloemfontein, from Pretoria; Miss M. H. Congleton, to Pretoria, from Bloemfontein; Miss V. L. W. Bird, to London, S.W., on appointment; Miss A. Bradley, to Woolwich, on appointment; Miss M. Linaker, to Connaught, Hospital, Aldershot, on appointment; Miss M. M. Evans, to Woolwich, on appointment.

Promotions.—The undermentioned Sister to be Matron; Miss F. M. Hodgins.

Arrivals.—Miss A. A. Wilson, Sister from South Africa; Miss M. O. C. McCreery, Sister from Gibraltar.

NOTES FROM LIVERPOOL (WEST LANCASHIRE DIVISION) TERRITORIALS.

Captain Spiller, R.A.M.C., writes:—

(1) School of Instruction { Serjeant-Major Barlow, R.A.M.C.
Company-Serjeant-Major Gasser, A.S.C.
Staff-Serjeant Sparrow, R.A.M.C.

The undermentioned medical officers attended the school of instruction during the months of October and November, 1910, for instruction in examination "A," "B," "D"—December, 1910.

Major Gullan, No. 1 Field Ambulance "D" (Sanitation).
Captain Anderson, 5th Bn. King's Liverpool "A."
Lieutenant Simpson, No. 2 Field Ambulance "A" and "B."
Lieutenant Donnell, Medical Officer Royal Garrison Artillery "A."
Surgeon-Lieutenant Livingstone, Westmore, and Cumberland Yeomanry "B."
All these officers were successful, Major Gullan obtaining 9.

The Adjutant on the invitation of the General Staff Officer Coast Defences gave an address at Headquarters of No, 1 Field Ambulance, on February 22, 1911, to all the Officers of the Division on the "Medical Services in War." About fifty officers were present.

A series of lectures including Medical Tactics, Reconnaissances and Appreciations, by the Adjutant, have just concluded. The Lectures were attended by the following Royal Army Medical Corps Territorial officers: Lieutenant-Colonels Dawson, Knowles, Jackson; Majors O'Hagan, Stevenson, Gemmel; Captain Graham; Lieutenants Hope Simpson, MacDonald, Hawksley, Brebner, Simpson, Williams, Merrick, Kidston, Martin, Young.

All the permanent staff instructors attended these lectures.

Classes of Instruction for subjects "A," "B," and "D," examinations to be held in May have just commenced. The following officers are attending:—

Major O'Hagan, No. 11 Field Ambulance "D"; Major Green, No. 4 Cheshire Regiment "D"; Captain Anderson, Medical Officer, 5th Battalion King's Liverpool "B"; Lieutenant Donnell, Medical Officer, Lancashire and Cheshire R.G.A. "B"; Lieutenant Kidston, Medical Officer, King's (Liverpool) Scottish "A" and "B"; Lieutenant Brown, Medical Officer, Heavy Battery, W. Lancashire R.G.A. "A" and "B."

(2) *No. 1 Field Ambulance.*—The officers of this unit held their annual meeting on January 31, at Tramway Road, when a plan of training for 1911 was drawn out. This unit has lately moved to new Headquarters; and it is feared there will be many resignations and transfers, as the *personnel* is largely recruited from the other end of Liverpool. However, strenuous endeavours are being made by Serjeant-Major Mester to get new recruits from the Garston side.

It is hoped that a three days' camp will be arranged for Easter.

"C" section of this unit consists almost entirely of students, who are difficult men to deal with on account of their many examinations.

(3) *No. 2 Field Ambulance.*—The first drill of the year was held at Low Hill, on January 18. Lieutenant-Colonel Dawson, V.D., the officer commanding, took the opportunity of presenting to Serjeant-Major Yeo, R.A.M.C.—the permanent Staff Instructor—the Good Conduct Medal. In a very apt and happy speech he congratulated the recipient on his well-merited decoration.

The Commanding Officer also informed the unit that they had been selected to accompany the Liverpool Brigade on the Army Manœuvres.

Strong endeavours are being made to fit the unit in every way for its forthcoming arduous duties, and the Administrative Medical Officer has detailed the Adjutant and Permanent Staff of School of Instruction to assist the officers in every way.

No. 2 Field Ambulance is only a few men short of its establishment.

The Annual Dinner was held at the Red Cross Restaurant, on February 18. A very enjoyable evening was spent, and the Officer Commanding made a most stirring speech in which he asked the men to appreciate the honour conferred on their unit, and to use their best endeavours to attend the manœuvres.

Amongst the guests were Colonel Damer Harrison (the Administrative Medical Officer), Lieutenant-Colonel Ewan, R.A.; Lieutenant-Colonel Nathan Raw, Western General Hospital, and Captain Spiller, R.A.M.C. The following officers of the Field Ambulance attended the function: Lieutenant Colonel Dawson, V.D.; Major's Stevenson and O'Hagan; Lieutenants Hawksley, Williams, Brebner, Noble, Simpson, and Quail.

(4) *No 3 Field Ambulance.*—This unit which consists of a section at St Helens, Blackpool, and Kendal has lately been re-organised—the Blackpool section having been disbanded, and Lieutenant-Colonel Jackson has now permission to recruit two sections at St. Helens. Undoubtedly this will materially increase its efficiency especially when the new building is completed.

No. 1 (St. Helens) section gave an extremely enjoyable dance at the Town Hall, St. Helens, on February 3. Serjeant-Major Payne was master of ceremonies. The guests numbering about 150 were received by Lieutenant-Colonel Jackson, Mrs. Jackson, and Miss Jackson. Amongst the guests were Lieutenant-Colonel and Mrs. Knowles, R.A.M.C.; Lieutenant-Colonel Thomas and Officers of the Rifles, Captain and Mrs. Spiller, and Captain Graham—the Staff Officer to the Administrative Medical Officer.

EXAMINATIONS.

THE following questions are published for general information:—

QUARTERMASTER-SERJEANTS.

Para. 285, b. 1.

(1) Explain how carts or service wagons may be utilised in place of ambulance wagons.

(2) A Company has "fallen in" on the march, state in detail what should be done prior to its inspection by the company commander.

(3) How would you instruct a squad in loading the upper compartment of an ambulance wagon?

(4) How should field kitchens and field destructors be made?

(5) The officer commanding has selected the site of a dressing station. What would guide him in selecting the site? Briefly state preparations to be made for the wounded?

(6) Give the disposition in action of a field ambulance?

(7) How is a railway wagon prepared for the reception of sick and wounded by "Zavodovski's method?"

(6) What is the composition of a field ambulance? What does its transport consist of and how many sick will it accommodate?

Para. 285, b. 2.

(1) What procedure will be adopted in recording the inventory of a patient's kit?

(2) What entries are made in the guard report? Who signs them and what becomes of them?

(3) How are stores obtained by the steward? How is their receipt acknowledged?

(4) How are the arms and equipment of wounded carried off the field? Where are they stored and how is their accumulation prevented?

(5) What additional duties does the senior N.C.O. perform at a hospital where there is no quartermaster?

(6) How are men dieted in a field ambulance?

(7) How is a personal charge against an orderly recovered?

(8) Explain the duties of a warrant officer regarding the committal and release of soldiers in arrest and under sentence.

Para. 285, b. 3.

(1) What is done with the surplus accoutrements given into store by non-effectives and what provision is made for necessary repairs?

(2) What arrangements are made in peace for the provision of medical equipment to a field ambulance on mobilisation?

(3) What are the rules laid down for the storage, care and turnover of reservists' kits held on charge in mobilisation clothing store?

(4) Define the responsibilities of a quartermaster with regard to the clothing of a company of the Corps, and state the method of issue of clothing and necessaries from store to individuals.

(5) What constitutes a "free kit"? To whom is it issued, and how is it afterwards maintained?

(6) Give a list of articles comprising a recruit's issue of public and personal clothing, and state opposite each of the former articles the period it has to wear.

(7) Where are clothing and necessaries for reservists' mobilisation stored? What are the instructions regarding measurements and how are they recorded? How are: (1) Great coats, jackets, trousers stored; (2) The remaining articles of kit, and where are they held on charge and accounted for?

(8) If you were ordered to arrange for the equipment for a camp of exercise on what voucher would you demand and from whom? What ledger would you account for it in?

What are the regulations for the issue of tent boards in standing camp?

Para. 285, b. 4.

(1) What are the regulations governing issues to (1) Soldiers' families of surgical appliances and their repair and replacement; (2) invalids after discharge?

(2) Where is the scale of medicines authorised for military hospitals laid down? What is the course to pursue to obtain articles not so laid down?

(3) How are medicines, instruments, &c., accounted for at a military hospital? To whom and when are the returns sent?

(4) What medical and surgical equipment should be placed on board freight ships carrying troops abroad?

(5) What instructions are laid down as to inspection, care and preservation of field medical equipment held on charge for mobilisation purposes?

(6) What is the scale of medical and surgical equipment for a field ambulance when the sections are mobilised as separate units?

(7) When field medical equipment is returned to store what documents should accompany it and what information should it afford?

(8) What units would obtain medical supplies from an advanced depot of medical stores? What *personnel* is allowed for an advanced depot? What is the approximate weight of stores carried and by whom is transport provided?

STAFF-SERJEANTS.

Para. 284, b. 1.

(1) Where are the following events recorded, and how is the officer in command Royal Army Medical Corps records kept informed?
(a) Gallantry in the field.
(b) Married on the strength.
(c) Courts of inquiry on injuries.
(d) Reduction to the rank of corporal by district court-martial.

(2) What terms must be adhered to in recording a soldier's character on discharge or transfer to the reserve? What considerations are allowed to modify indifferent or bad characters?

(3) In case of conviction by court-martial for desertion or fraudulent enlistment, how much forfeited service can be restored to reckon as service?

(4) Give a list of entries which should be made in a soldier's statement of services.

(5) In the event of a duplicate attestation being lost, how is the matter dealt with?

Para. 284, b. 2.

(1) What are the rules in regard to extra remuneration granted to a soldier for performing the duties of a higher rank or appointment?

(2) The following items occur in a man's account during October: (a) Fine 5s., drunk. (b) Tailor, 8s. 6d. (c) Granted service pay, class (2) at 4d. from September 30, 1910. (d) H. 1,181, 7s. 10d. (e) Allotment of barrack damages, 3½d. How are these entries inserted in pay and mess book?

(3) What is the procedure with regard to cash payments to soldiers on active service?

(4) (a) A serjeant on the married establishment is sent abroad without his wife and children. What amount of his pay shall he contribute towards their maintenance?
(b) Similarly, a married private with one child is separated from his family. What stoppage will be made from his pay, and what is the maximum he can allot?

(5) What are the regulations regarding Corps pay of probationers on transfer to the Royal Army Medical Corps?

SERJEANTS.

Para. 283, b. 1.

(1) What are the positions of company, half-company, and section commanders?
(a) A company in fours.
(b) A company in line retiring.

(2) (a) Explain the following terms: Distance, covering, file, directing flank, section.
(b) What do you understand by a squad with intervals?
(c) Give detail for sizing a company ceremonial drill.
(d) How do you form company column from a company in line on the march.

(3) Give the detail for sizing a company, and state how you would divide a company consisting of fifty-nine files into half-companies and sections.

(4) A company moving to a flank receives the following command from the company commander. "Company column on the leading section, remainder right incline, double march." What commands are given by the section commanders, and how do the sections act?

Para. 283, b. 2.

(1) How would you proceed to dismiss a squad of men who have been carrying out stretcher drill with patients?

(2) In exercising with closed stretchers, what happens on the command "squads about turn—change stretchers"?

(3) What commands are required to form an unsized company into complete stretcher squads?

(4) Give detail for: (i) Prepare stretchers; (ii) load stretchers.
(a) Describe the positions taken up by a stretcher squad on the command "stand to stretchers."

(*b*) Give the various words of command for loading ambulance wagons after you have loaded stretchers.

(*c*) Eight stretcher squads are advancing and receive the order "From the right to four paces extend." How is the movement effected?

Para. 283, b. 3.

(1) Your company officer orders you to place a man in open arrest for an offence. State how you act, and what steps you would take before bringing the accused before his company officer next morning.

(2) (*a*) What do you understand by (i) open arrest, (ii) close arrest in the case of a private soldier? How does he stand as regards duties, parades, &c. (*b*) For what kind of offences may a private soldier be placed in close arrest. State the regulations as regards bedding and exercise for soldiers so confined. (*c*) Distinguish between (i) detention, (ii) imprisonment, and by whom can these punishments be awarded.

(3) You are orderly serjeant when a corporal is found drunk in your barrack room, state how you would act.

(4) How is a person disposed of who is not serving as a soldier and is apprehended or surrenders himself as a deserter?

Para. 283, b. 4.

(1) What are the orders relative to handing over stores and furniture in charge of a guard?

(2) What does the warrant or senior N.C.O. do when a man is absent without leave and is suspected of desertion?

(3) You are commander of a picquet sent into town to preserve discipline amongst soldiers there. What are your duties?

(4) You are N.C.O. in charge of police when the fire alarm sounds. How would you act?

Para. 283, b. 5.

(1) What is the rule as regards compliments on the march?

(2) On which flank of a column on the march is road space left for the passage of orderlies and others? What exception is there to this rule.

(3) Discuss the question of the most suitable hours for marching and arriving in camp, and state how fatigue on the line of march may be reduced as far as possible.

(4) You are in charge of a medical inspection room attached to a unit. What are your duties as regards (i) the sick; (ii) equipment, medical and surgical; (iii) documents.

Para. 283, b. 6.

(1) When a soldier is sentenced to penal servitude and in consequence dismissed from the Service, what are the regulations regarding any private property he may possess?

(2) What army forms are required for preparing a list of articles for exchange?

(3) What are the regulations in regard to the custody of poisons?

(4) Give a list of extras which may be issued with all diets.

CORPORALS.

Para. 280, e. 1.

(1) If a drunken soldier in the guard-room stabs himself, who should expect to suffer punishment? Give your reasons.

(2) If a man is sentenced to fourteen days' detention on March 1, and his troopship is due to sail on March 5, what happens to him?

(3) What duties may an offender while in arrest be required to perform?

Para. 280, e. 2.

(1) Does a guard turn out to pay a compliment to an officer not in uniform?

(2) What is a "fire picquet"? How often should the fire engine be tested, and how is the testing carried out?

(3) What kit does a patient bring into hospital with him, and how is the remainder of his kit disposed of?

Para. 280, e. 3.

(1) What precautions would you take for your health and comfort before, during, and after a march?

(2) In a camp, if running water is not available, what arrangements are made for the protection of the water supply, and for the watering of animals, washing, &c.?

(3) What do you consider the best drink on service? Give your reasons.

Para. 280, e. 4.

(1) In a hospital where nursing sisters are employed, what are the duties of a senior N.C.O. as regards (*a*) Discipline, (*b*) Deaths in hospital, (*c*) Patients' letters?

(2) What are the duties of a warrant officer or senior N.C.O. in charge of a hospital with regard to damages or deficiencies in hospital?

(3) What paper work devolves upon the attendant in charge of a dining-hall in a large hospital? To what section of the Corps does he belong?

Para. 280, e. 5.

(1) How would you carry an insensible man out of action on a horse?

(2) Describe the fireman's lift and for what cases is it suitable?

(3) How can a canal or river be crossed with loaded stretchers when no boats or bridges are available?

Para. 280, e. 6.

(1) Describe the treatment of a patient suffering from suffocation by coal gas.

(2) How would you endeavour to arrest severe hæmorrhage from a wound of the palm?

(3) (i) Give the treatment for corrosive poisoning.
(ii) Describe the treatment for a hornet sting.
(iii) Under what circumstances may it be necessary to perform tracheotomy?

Para. 280, e. 7.

(1) Compare the methods of ventilation of this hospital with those used in any hospital in which you have served elsewhere.

(2) What is the effect on the ventilation of a ward of (*a*) lighting the fire, (*b*) lighting the gas jets?

(3) What is the substance which contaminates the air in a ward? How does it originate?

Para. 280, e. 8.

(1) You are in charge of a medical companion and a surgical haversack. The medical officer asks for chloroform, a hypodermic needle, and specification tallies. Where would you find them?

(2) Describe accurately the clinical thermometer, state what temperature it will register, and what is the normal body temperature. Where will you find the clinical thermometer in the field medical companion?

(3) What is the composition of a first field dressing? State how you would dress two wounds with it.

UNITED SERVICES MEDICAL SOCIETY

THE next meeting of the above-named Society will be held at the Royal Army Medical College, Grosvenor Road, S.W., on Wednesday April 12, 1911, at 5 p.m., when papers will be read by Major E. B. Waggett, R.A.M.C.(T.), on "The Medical Strategy of the London District," and by Lieutenant A. J. Martin, M.I.C.E., 2nd London Sanitary Co., on "The Sanitation of Standing Camps."

BIRTHS.

BROWNE-MASON.—On February 12, 1911, at 7, Prince of Wales Road, Poona, the wife of Major H. Browne-Mason, R.A.M.C., of a daughter.

EMERSON.—On February 14, 1911, at 4, The Common, Ealing, the wife of Captain Horace A. Emerson, R.A.M.C., of a son.

HANAFIN.—On February 19, at St. Ives, Woodside Avenue, Esher, Surrey, to Captain and Mrs. P. J. Hanafin—a daughter.

BOWLE.—On February 27, 1911, at The Elms, Winchester, to Captain and Mrs. S. C. Bowle, R.A.M.C.—a daughter.

SEWELL.—On March 5, 1911, at 2, Ormskirk, Alexandra Gardens, Belfast, the wife of Captain E. P. Sewell, R.A.M.C., of a son.

CANE.—On March 16, 1911, at 3, Fawley Mansions, West Hampstead, N.W., the wife of Lieutenant Arthur S. Cane, R.A.M.C., of a daughter.

POWER.—On April 11, 1911, at Port Royal, Jamaica, to Captain and Mrs. W. Martin Power—a son.

DEATHS.

GARDNER.—At East Grinstead, on February 18, Honorary Brigade Surgeon Thomas Turville Gardner, half-pay, late Army Medical Department, aged 80. He entered the Service as Assistant Surgeon (Staff), on May 7, 1858, served also in the 1st Foot, 90th Foot and Royal Artillery, became Surgeon, Army Medical Department on March 1, 1873, Surgeon-Major April 1, 1873, and retired on half-pay with the honorary rank of Brigade-Surgeon on August 25, 1881. He was re-employed in 1885, during the operations in Egypt, and held the charge of the Military Hospital at Portsmouth.

HENSMAN.—At Penkridge, Staffordshire, on February 21, Colonel Henry Frank Hensman, C.M.G., retired pay, aged 71. He entered the Army as an Assistant Surgeon (Staff), on March 31, 1862, served with the 77th Foot from June 3, 1864, till February 28, 1873; became Surgeon, Army Medical Department, on March 1, 1873; transferred to the 2nd Life Guards, August 26, 1876; became Surgeon-Major, 1st Life Guards, June 29, 1880; Surgeon-Lieutenant-Colonel, March 31, 1882, and retired on retired pay, October 25, 1894. He received the C.M.G., April 16, 1901, and was promoted Colonel on the retired list on October 18, 1902, in recognition of services during the operations in South Africa. His war service was: North West Frontier of India Campaign, 1863—Umbeyla Expedition; served with the Derbund Field Force. South African War, 1899-1900; despatches, *London Gazette*, April 16, 1901. Queen's medal with clasp. C.M.G. At the outbreak of the war in 1899, Colonel Hensman volunteered for service at Home, and was appointed to the charge of the Hospital at Shorncliffe. Shortly afterwards he was given the charge of the Hospital Ship "Maine" which he held until the vessel went to China, in July, 1900. He was then re-appointed to Shorncliffe, where he remained until April, 1903.

BENT.—On March 8, 1911, Major George Bent, retired, late Royal Army Medical Corps, aged 50. He entered the Army as a Surgeon, Medical Staff, on July 28, 1886; became Major Royal Army Medical Corps, on July 28, 1898, and was placed on retired pay on July 28, 1906. His war service was: Hazara Expedition, 1888. Medal with clasp.

GILLATT.—At Cairo on March 8, 1911, Captain William Harold Gillatt, M.B., Royal Army Medical Corps, aged 32. He entered the Service on January 30, 1906; became Captain July 30, 1909. His war service was: Sudan, 1908. Operations in the Blue Nile Province, Egyptian medal. Operations in Jebel Nyima District of Southern Korodofan, clasp to Egyptian medal.

EXCHANGES, &c.

The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, Serle Street, London, W.C., not later than the 22nd of the month.

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MANAGER'S NOTICES.

The JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January, but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in March and September of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters regarding non-delivery of the Journal, or change of address, should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and reach there not later than the 20th of each month.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

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THE HON. MANAGER,
"JOURNAL OF THE ROYAL ARMY MEDICAL CORPS,"
WAR OFFICE, WHITEHALL, S W.

Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notified at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Major F. J. W. Porter, Captain R. G. H. Tate, Captain W. M. H. Spiller, Captain A. H. Safford, Serjeant W. A. Muirhead, Major W. S. Harrison, Captain W. L. Bennett, Colonel Sir David Bruce, Captain A. W. Howlett, I.M.S., Lieutenant-Colonel C. H. Melville, Lieutenant-Colonel F. H. Treherne, Lieutenant-Colonel R. J. S. Simpson, Major J. W. Gibbard, Captain L. W. Harrison, Lieutenant A. S. Cane, Major W. W. O. Beveridge, Fleet-Surgeon R. C. Munday, R.N., Major B. W. Longhurst.

The following publications have been received:—

British: The Hospital, The Journal of Tropical Medicine and Hygiene, Journal of the Royal Institute of Public Health, Army and Navy Gazette, The Lancet, The Australasian Medical Gazette, Sydney Harbour Trust Commissioners' Tenth Report, Public Health Annual Report of Tasmania, Journal of the Royal United Service Institution, The Practitioner, The Royal Engineers Journal, Journal of the Royal Sanitary Institute, Medical Press and Circular, Proceedings of the Royal Society of Medicine, The Shield, St. Thomas's Hospital Gazette, The Indian Medical Gazette, St. Bartholomew's Hospital Journal, Guy's Hospital Gazette, Public Health, The Medical Review, Transactions of the Society of Tropical Medicine and Hygiene.

Foreign: Archives de Médecine et Pharmacie Navales, Office International d'Hygiène Publique, Memorias do Instituto Oswaldo Cruz, Bulletin of the Johns Hopkins Hospital, Le Caducée, Revista de Sanidad Militar, Annali di Medicina Navale E Coloniale, Resoconto Sommario Clinico Statistico-Operativo, Russian Naval Medical Journal, Norsk Tidsskrift for Militaermedicin, Report of the Commissioner of Health of Pennsylvania, Archives de Médicine et de Pharmacie Militaires, The Military Surgeon, Militærlægen, Giornale di Medicinæ Militare, Deutsche Militärärztliche Zeitschrift, The Cleveland Medical Journal, Russian Army Medical Journal.

JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS.

Corps News.

May, 1911.

ARMY MEDICAL SERVICE.

Colonel Arthur P. O'Connor, C.B., on completion of four years' service in his rank, retires on retired pay, dated April 5, 1911. Colonel O'Connor entered the Service as a Surgeon, Army Medical Department, on March 6, 1880; became Surgeon-Major, Medical Staff, March 6, 1892; Lieutenant-Colonel, Royal Army Medical Corps, March 6, 1900, and Colonel, April 5, 1907. His War Service is: Burmese Expedition, 1885-6. Medal with clasp South African War, 1899-1902. Operations in Cape Colony, south of Orange River, 1899-1900. Operations in the Transvaal and Orange River Colony, September, 1901. Operations in Cape Colony, November 30, 1900 to April, 1902. Despatches, *London Gazette*, April 16, 1901. Queen's medal with two clasps. King's medal with two clasps. C.B.

Brevet-Colonel Francis J. Lambkin, from the Royal Army Medical Corps to be Colonel, *vice* A. P. O'Connor, C.B., dated April 5, 1911.

ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonel William J. Baker retires on retired pay, dated March 25, 1911. Lieutenant-Colonel Baker entered the Service as a Surgeon, Army Medical Department, on February 5, 1881; became Surgeon-Major, Army Medical Staff on February 5, 1893; Lieutenant-Colonel, Royal Army Medical Corps, on February 5, 1901, and Lieutenant-Colonel with increased pay on April 22, 1905. His War Service is: South African War, 1899-1902. Operations in the Orange Free State, April to May, 1900. Operations in the Transvaal in May and June, 1900, including action near Pretoria. Operations in the Transvaal, east of Pretoria, July to November, 1900. Operations in Cape Colony, south of Orange River, 1899-1900, including actions at Colesberg, January 1 to 6. Operations in the Orange River Colony and Cape Colony, November to December, 1900. Operations in the Transvaal, December, 1900, to March, 1901. Queen's medal with three clasps. King's medal with two clasps.

Lieutenant Colonel William Dick, M.B., is placed on retired pay, dated April 6, 1911. Lieutenant-Colonel Dick entered the Service as Surgeon, Army Medical Department on February 4, 1882; became Surgeon-Major, Army Medical Staff on February 4, 1894; Lieutenant-Colonel, Royal Army Medical Corps, February 4, 1902, and Lieutenant-Colonel with increased pay on February 5, 1908. His War Service is: Soudan Expedition, 1884-5. Nile. Action of Abu Klea. Medal with two clasps, bronze star.

Major Arthur O. B. Wroughton is placed temporarily on the half-pay list on account of ill-health, dated March 20, 1911.

Captain Ernest G. Ford, M.B., retires, receiving a gratuity, dated April 8, 1911.

HIGHER RATE OF PAY.—The undermentioned Lieutenant-Colonels have been selected for the higher rate of pay under Article 317, Royal Warrant, viz.: W. Turner, R. Caldwell.

ARRIVALS HOME FOR DUTY.—From India: On March 16, Major C. A. Stone, Captains J. E. Hoar, C. W. O'Brien, and E. L. Moss. On March 31, Brevet-Lieutenant-Colonel O. R. A. Julian, C.M.G.; Captains A. A. Meaden, Jas. H. Campbell, and N. Low. From Malta: On March 16, Captain T. H. Gibbon. On March 23, Captains R. G. Meredith and F. E. Roberts. On March 31, Major G. S. Crawford. From Egypt: On March 23, Lieutenant-Colonel W. J. Baker, Major J. C. Jameson; Captain J. M. B. Rahilly. From West Africa: On March 14, Lieutenant-Colonel A. A. Sutton, D.S.O.; Major A. L A. Webb; Captain G. Baillie. On March 16, Captain H. B. Connell. On March 20, Major J. W. Leake. On March 22, Lieutenant G. H. Stack.

POSTINGS.—Scottish Command: Captain F. E. Roberts; Northern Command: Captain R. G. Meredith; Western Command: Captain Jas. H. Campbell; Aldershot Command: Lieutenant-Colonel W. E. Berryman; Eastern Command: Major J. C. Jameson, Captains J. B. Clarke, T. H. Gibbon, J. M. B. Rahilly; Southern Command: Major C. A. Stone; Irish Command: Brevet-Lieutenant-Colonel O. R. A. Julian, C.M.G., Major G. S. Crawford, Captains A. A. Meaden, N. Low, J. E. Hoar, C. W. O'Brien, E. L. Moss; Lieutenant W. H. S. Burney; London District (temporarily pending return to West Africa) Captain H. W. Long.

TRANSFERS. -Colonel R. W. Ford, D.S.O., Lieutenant-Colonel F. J. Jencken, and Lieutenant-Colonel H. A. Haines, from the Southern Command to the Eastern Command; Major H. E. Staddon from the Irish Command to the Eastern Command: Captain H. R. Bateman from London District to Eastern Command; Captain R. K. White from Aldershot Command to Irish Command.

TRANSFERRED TO HOME ESTABLISHMENT.—Lieutenant W. H. S. Burney from the Egyptian Army, April 1.

APPOINTMENTS.—Colonel R. W. Ford, D.S.O., Administrative Medical Officer at Woolwich and charge of the Royal Herbert Hospital; Colonel T. J. O'Donnell, D.S.O., Administrative Medical Officer at Tidworth; Colonel W. G Birrell, Administrative Medical Officer at Dover; Lieutenant-Colonel F. J. Jencken, Administrative Medical Officer at Colchester; Lieutenant-Colonel C. E. Faunce, Administrative Medical Officer at Chatham; Lieutenant-Colonel H. A. Haines, Officer in charge of Military Hospital, Chatham, and Senior Medical Officer, Eastern Coast Defence; Lieutenant-Colonel W. T. Swan, Officer in charge of Royal Victoria Hospital, Netley; Captain O. W. A. Elsner, Sanitary Officer (temporary), Pretoria, Potchefstroom and Natal Districts, South Africa; Captain J. B. Clarke, Specialist in Operative Surgery, Colchester.

QUALIFICATION. Captain L. Cotterill qualified at the examination (Musketry) held at the School of Musketry, Hythe, on February 24, 1911 (distinguished).

ARRIVALS HOME ON LEAVE.—Lieutenant-Colonels A. F. Russell, C.M.G.; Sir R. Wills and Sir J. Fayrer, Bt.; Majors G. St. C. Thom, J. G. Gill, and H. Ensor, D.S.O.; Captains A. S. Williams, J. A. Bennett, C. Cassidy, A. Fortescue, and H. G. Gibson.

EMBARKATIONS.—For Egypt. On April 1, Lieutenant-Colonel W. W. Pike. D.S.O. For South Africa: On March 31, Lieutenant-Colonel R. G. Hanley.

ROSTER FOR SERVICE ABROAD.—An exchange has been approved between Majors St. J. B. Killery and G. H. Goddard.

RESULTS OF EXAMINATIONS.

The following results of examinations are notified for general information:—

Passed for the rank of Lieutenant-Colonel, in all technical subjects:—

Part I - Subject (2) in S. and E.: G. St. C. Thom, E. B. Steel, M.B.

Passed in (*d*) ii, for promotion to the higher ranks:—

Majors: F. E. Gunter, E. W. Bliss, H. G. Martin, G. B. Crisp.

Captains: W. Davis, T. C. Lucas, M.B., H. T. Wilson.

Passed for promotion to the rank of Captain: In (*b*): C. E. L. Harding, F. H. Somers-Gardner, J. Startin, G. H. Stack, J. A. Manifold. In (*h*): J. E. Ellcome, F. H. Bradley, B. Varvill, G. Petit, J. W. Houston, A. Shepherd, C. E. L. Harding, A. H. T. Davis, J. S. McCombe, W. J. Tobin, R. O'Kelley, J. B. Hanafin, J. B. Jones. In (*h*) i: F. B. Dalgleish, T. S. Eves, R. F. O' T. Dickinson. In (*h*) ii, T. S. Eves, R F. O'T. Dickinson. In (*h*) iii, F. B. Dalgleish. In (*d*) ii, J. E. Ellcome, F. H. Bradley, B. Varvill, C. E. L. Harding, R. O'Kelly, G. Petit, J. F. Hanafin, C. P. O'Brien-Butler.

NOTES FROM DEVONPORT.—Captain Tobin writes :—

"Re-Opening of the Military Families' Hospital.

"Following on the building of nurses' quarters and general reconstruction of the buildings, the Military Families' Hospital, Devonport, was formally re-opened on Friday afternoon, March 3, by Mrs. Bowles, wife of Major-General F. A. Bowles, C.B., Commanding the South-Western Coast Defences.

"Mrs. Bowles, who was introduced by the Administrative Medical Officer, Devonport District, said the hospital was first opened in 1865, when there was only a single ward used for maternity cases. To-day there were five wards, a maternity ward, a general ward, a children's ward, and two observation wards. Mrs. Bowles also referred to the valuable work performed by the institution in the garrison, and to its high standard of efficiency. The number of maternity cases treated during the past year was 118.

"At this stage the hospital was declared re-opened. After a vote of thanks, proposed by Colonel R. Jennings, and seconded by Lieutenant-Colonel R. Kirkpatrick, C.M.G., R.A.M.C., Mrs. Bowles was presented with a handsome bouquet by Miss Monica Jennings.

"Following the ceremony, Captain J. Tobin, R.A.M.C., medical officer in charge, and his staff were 'At Home' to the guests in the new nurses' quarters.

"There was a large number of guests, among those invited being Admiral Sir Wilmot and Lady Fawkes; Major-General F. A. Bowles; Lieutenant J. A. Bowles, R.A., A.D.C.; Colonel F. G. Stone, C.R.A., and Mrs. Stone; Colonel S. R. Rice, C.R.E., and Mrs. Rice; Colonel-Commandant C. G. Brittan, R.M.L.I., and Mrs. Brittan; Colonel R. Jennings, and Mrs. Jennings; Colonel F. C. Shaw, 2nd Sherwood Foresters, and Mrs. Shaw; Lieutenant-Colonel R. Kirkpatrick, R.A.M.C.; Lieutenant-Colonel F. T. H. Scott, R.M.L.I., and Mrs. Scott; Major H. A. Boyce, D.A.A. and Q.M.G., and Mrs. Boyce; Major A. J. Saltren Willet, R.G.A., and Mrs. Saltren Willet; Major Noel Smith, R.M.L.I., and Mrs. Noel Smith; Commander and Mrs. E. Hewetson; Fleet-Surgeon and Mrs. E. Corcoran; Major A. Canning, Leinster Regiment, and Mrs. Canning; Major E. A. W. Courtenay, A.S.C., and Mrs. Courtenay; Major N. Tyacke, R.A.M.C., and Mrs. Tyacke; Major P. H. Collingwood, R.A.M.C., and Mrs. Collingwood; Major H. D. Packer, R.A.M.C., and Mrs. Packer; Captain Norman Buzzard, R.G.A., and Mrs. Buzzard; Captain R. F. Legge, Leinster Regiment, and Mrs. Legge; Captain R. W. Gray, Leinster Regiment, and Mrs. Gray; Captain E. E. Parkes, R.A.M.C., and Mrs. Parkes; Captain M. C. Beatty, R.A.M.C., and Mrs. Beatty; Captain J. W. Waters, R.A.M.C., and Mrs. Waters; Miss Payne, Matron, Q.A.I.M.N.S.; Dr. and Mrs. Sandford; Dr. and Mrs. Roberts; and Miss E. Weston, Royal Sailors' Rest.

"A delightful programme of music was discoursed by the string band of the 1st Leinster Regiment, under the direction of Serjeant Williams, the selections being :—

1. *March*	'Under Freedom's Flag'	*Nowowieski.*	
2. *Overture*	'The Golden Lyre'	*Herman.*	
3. *Valse*	'The Druid's Prayer'	*Dawson*	
4. *'Cello Solo*	'Angels Guard Thee'	*Godard.*	
5. *Intermezzo*	'Rendezvous'	*Aletter.*	
6. *Gavotte*	'Les Cloches de St. Malo'	*Ilimmer.*	
7. *Two-step*	'Gaily through the World'	*Macbeth.*	
8. *Valse*	'Songe d'Automne'	*Joyce.*	
	'God Save the King.'		

"After tea the guests were conducted through the wards, and expressions were general as to the way in which the comfort and convenience of patients are provided for."

NOTES FROM FORT PITT, CHATHAM.—Quartermaster-Serjeant A. G. Audus writes April 14, 1911 :—"On Monday, March 27, a very successful smoking concert was held by the members of the N.C.O.'s mess, 10th Company R.A.M.C., at Fort Pitt, to bid farewell to Serjeant-Major H. J. Ford, who was leaving on furlough prior to discharge to pension on completion of twenty-five years' service.

"A large number of visitors from the various Corps in the garrison, also several ladies, were present. Major Carter, Captain Spackman, Lieutenants Bevis, Davies, and Treves also joined the gathering during the evening.

"The proceedings commenced punctually at 7.30 p.m., Quartermaster-Serjeant

Audus presiding. A well-varied programme had been drawn up, the songs, recitations, &c., rendered, all tending towards the evening's enjoyment.

"During the evening the Chairman made a suitable presentation, on behalf of the members of the Mess, to Serjeant-Major and Mrs. Ford, and in a few appropriate words wished them success and prosperity in their new sphere of life, and asked the company present to drink to their good health, which was carried out with musical honours. Serjeant-Major Ford responded, regretting his departure from the Service and also from Chatham, in which he had spent the past four years. He thanked the N.C.O.'s for the able support they had given him during his period with 10th Company, and hoped that his successor, Serjeant-Major L. Jones, who had just arrived from Egypt as his relief, would be given the same willing assistance by all.

"After a most enjoyable evening, 'Auld Lang Syne' and 'God Save the King' brought the proceedings to a conclusion at 11 p.m.

"Serjeant-Major Ford was the recipient of several other gifts, presented to him on leaving the Service by friends and others."

NOTES FROM MALTA.—Serjeant-Major Collard writes: "The annual training has now been completed. We were able to establish communication between Cottonera and Fort San Leonardo (training ground), a distance of over 2½ miles, cross country, with semaphore flags, 2 feet square, with the aid of glasses.

"Serjeant-Major Dudman has been permitted to take his discharge in Malta in August.

"No. 1463 Private W. E. Durrant, who arrived in Malta in January last, after a brief illness succumbed to septicæmia following carbuncle on March 14. The funeral took place on March 15. The detachments sent representatives. The parade was under command of Captain J. A. Hartigan (Company officer), Lieutenant-Colonel A. F. Russell, C.M.G., and several other officers also followed. The expressions of sympathy were many. Wreaths were received from Colonel R. Porter, P.M.O., and officers R.A.M.C., ladies Q.A.I.M.N.S., one from each of the serjeants' messes, R.A.M.C., Cottonera and Valletta, also from detachments Imtarfa, Forrest, and Valletta, and Headquarters. The firing party and band were supplied by the 2nd Gloucester Regiment. The interment took place at Rinella Cemetery, the service was conducted by the Rev. Miller, C.F., C. of E.

"The cricket season has opened; a trial match, Headquarters *v.* Detachments, took place on the Marsa on April 11, resulting in a win for the detachments; Major H. S. Thurston ran a score of 37, and retired with S. M. Huntingford; Serjeant Talbot made 51, while Lance-Corporal Staff batted well; altogether the cricket team should, if all the players do as well in Corps matches as in the trial, give a good account of themselves this season.

"Lieutenant-Colonel Russell is at present on leave in Scotland, and is expected to return at the end of April. The command of the Company has devolved on Captain M. H. Babington.

"The junior N.C.O.'s and men's Dance Club, Cottonera, dances, which continue to be very popular, conclude on April 18, and as a wind up the Company are giving their annual ball on the 28th.

"The undermentioned officers joined the Command by P. & O. s.s. 'Sardinia' on March 18, and have been posted as follows: Major A. H. Morris to Command Sanitary Officer; Lieutenant A. C. H. Suhr, to Valletta district; Quartermaster and Hon. Major Hasell to Cottonera.

"Major H. S. Thurston arrived per H.T. 'Soudan' on March 8, and has assumed charge of Military Hospital, and detachment 30th Company, R.A.M.C., Valletta."

NOTES FROM CAIRO.—"The 'Soudan' arrived in Egypt on March 11, bringing Captain R. N. Hunt and Lieutenant J. A. Clark, for duty in Egypt. She sailed on the 18th, having on board Lieutenant-Colonel W. J. Baker, about to retire, and Major J. C. Jameson and Captain J. M. B. Rahilly, tour expired.

"A few days before these moves a Mess meeting was held in the citadel followed by a farewell dinner. The Mess is in a very satisfactory state, thanks to the efforts of Captain Rahilly (who succeeded the first and very able Secretary, Captain Byam), who has acted as Mess Secretary for the past two years. It was proposed and carried that if at any future time it seemed expedient to dissolve the Mess, the matter should first be submitted to the Director-General, Army Medical Service, for his approval. It was also determined that in case of such dissolution the Mess property, such as silver, presentations, &c., and the balance after sale of other property, should be handed over

to the Royal Army Medical Corps Mess at Millbank. The Mess at present is in debt, on a loan from Messrs. Holt, to the amount of £80. The original sum was £100, and it is being yearly reduced by the sum of £10. It is not considered desirable or necessary to wipe off the whole debt from Mess profits, which should more properly be applied to increasing the comfort of the Mess, but it was thought that the allocation of about £10 yearly for that purpose would not be felt as a tax; and this would in time cancel the debt.

"A very cordial vote of thanks to Captain Rahilly was proposed by the Principal Medical Officer, and seconded by Lieutenant-Colonel Baker for his effort to promote the comfort of the members of the Mess, and to establish a sound financial position. The Principal Medical Officer added that when the officers on duty in a large hospital were made thoroughly comfortable in close proximity to their work, the whole hospital benefited, and that the officer who added this duty to other duties was doing good service.

"The dinner that followed was very pleasant. Fourteen officers were at table: Colonel T. M. Corker, Principal Medical Officer; Lieutenant-Colonel W. J. Baker; Majors T. B. Beach, J. C. Jameson, J. V. Forrest, and M. H. G. Fell; Captains E. E. Ellery, J. M. B. Rahilly, and R. E. Todd; Lieutenants A. E. G. Fraser, T. B. Nicholls, and S. McK. Saunders; Quartermasters and Honorary Captains A. J. Chalk, B. E. Essex.

"After 'The King' had been loyally drunk, the Principal Medical Officer proposed the health of Lieutenant-Colonel Baker. He said that his first meeting with Lieutenant-Colonel Baker in the Service was on a memorable journey they took together in a troop-train in India. The Principal Medical Officer of those ancient days—Deputy-Surgeon-General Johnston Ferguson—had given him six months' leave, but how to get home was another matter. He managed to get on duty with a hospital train which in those days took a fortnight to get to Bombay, depositing the patients in rest camps at dawn, and putting them on board again at night. At last thanks to the assistance of cricketing friends, Deolali was reached, and the invalids finally dumped down according to custom. Soon after, Lieutenant-Colonel Baker sailed home as an invalid, while the other remained behind intent still on a free passage as there was no £60 in the bank to pay for a first-class P. and O., and he eventually got one. Later it was a great pleasure to meet an old companion in arms in Cairo, and the Principal Medical Officer thanked Colonel Baker for his support and assistance in the work of the Command and in efforts to advance that are difficult to develop, but that bear fruit in the end. The Principal Medical Officer was sure that all officers who had served under Lieutenant-Colonel Baker would remember his kindly courtesy and consideration for all under him. The toast was drunk with musical honours and an artistic claret jug Colonel Baker had presented to the Mess, was passed round the table. Lieutenant-Colonel Baker then thanked the company for their kindly wishes. He said he felt that it was better for him to retire while he still had health and strength. He reciprocated all the kindly things said about him. As to the memorable journey, he said that while an invalid himself he had been put on one of the most arduous duties one could have in those days, the care of an invalid train, and at Allahabad he eventually had to report sick.

"The Principal Medical Officer then proposed the health of Major Jameson and Captain Rahilly. Major Jameson having replied, Captain Rahilly then thanked the officers for their vote at the Mess meeting and wished the Mess every prosperity in the future.

"An effort has been made this year to push the development of a section of a Field Ambulance. The General Officer Commanding allotted £25 from the Training Grant. The War Office was also asked for £20 to cover the expenses of devising new forms of carriage for sick and wounded. During the autumn the company officer—Major Forrest—devoted several afternoons to special drills in loading camels. The equipment was carefully worked out on paper, and all that was available was drawn from store by permission of the General Officer Commanding, and stored for use in these drills in the citadel. Finally the section moved into camp for the final manœuvres of the year at Katta. There were two officers, one warrant officer, and twenty N.C.O's. and men of the Royal Army Medical Corps under the orders of Major Forrest. Twenty camels were allotted. The appearance of these camels in four orderly lines of five each under detailed orderlies was smart and business-like. They carried medical equipment, a tent and operation table, medical comforts, wood and water, cacolets for ten wounded and extra stretchers. Twelve stretcher bearers were added, drawn from the regimental trained men.

"It is hoped that a section of a Field Ambulance will form a permanent feature in these yearly manœuvres.

"The sudden death of Captain Gillatt of the Royal Army Medical Corps of the Egyptian Army was much regretted. He was a cheerful and pleasant-officer. The usual military funeral took place, the Principal Medical Officer and officers of the Royal Army Medical Corps (both of the Army of Occupation and the Egyptian Army) walking as chief mourners, and the General Officer Commanding and several other officers in the garrison met the *cortège* at the gate of the cemetery. The Egyptian army will wear mourning for a month, and the Royal Army Medical Corps of the Army of Occupation will do the same."

NOTES FROM SIMLA.—Colonel R. S. F. Henderson, Secretary to Principal Medical Officer, His Majesty's Forces in India, writes as follows, dated March 28, 1911:—

"*Appointments.*—Brevet-Colonel R. S. F. Henderson, R.A.M.C., has been appointed Honorary Physician to His Majesty the King; Major M. P. C. Holt, D.S.O., R.A.M.C., has been appointed Honorary Surgeon to His Excellency the Viceroy *vice* Colonel R. S. F. Henderson, K.H.P., R.A.M.C., vacated.

"The following officers have been posted to the command of the Station Hospitals noted against them: Lieutenant-Colonel T. Daly, R.A.M.C., Peshawar: Major J. Ritchie, Dalhousie; Captain G. G. Tabuteau, Jutogh.

"Captain P. C. T. Davy, R.A.M.C., has been selected to officiate as Surgeon to His Excellency the Commander-in-Chief during the absence on leave of Captain A. E. J. Lister, I.M.S.

"*Leave.*—The grant of general leave out of India to the undermentioned officers has been concurred in: Colonel T. J. R. Lucas, six months from May 5, 1911; Major C. H. Whitestone, R.A.M.C., six months from May 2, 1911; Major L. E. L. Parker, R.A.M.C., eight months from April 8, 1911; Major W. P. Gwynn, R.A.M.C., seven months from April 1, 1911; Major B. Watts, R.A.M.C., three months from April 7, 1911: Captain A. Fortescue, R.A.M.C., four months; Captain F. L. Bradish, R.A.M.C., three months from April 8, 1911; Captain C. Scaife, R.A.M.C., six months from April 8, 1911; Captain C. E. Harding, R.A.M.C., eight months from April 1, 1911.

"*Postings.*—On arrival from England Major J. Mc. D. McCarthy and Lieutenant C. G. Sherlock, R.A.M.C., were posted to the 3rd instead of the 8th Division and Lieutenants J. J. H. Beckton and W. B. Rennie, R.A.M.C., have been posted to the 2nd and 4th Divisions respectively.

"*Specialists.*—The appointment of Captain W. R. P. Goodwin, R.A.M.C., as Ophthalmic Specialist, 1st (Peshawar) Division has been cancelled.

The following officers have been appointed specialists in the Divisions shown against them: Major F. Bliss, R.A.M.C., Advanced Operative Surgery, 4th (Quetta) Division; Captain F. Lambelle, R.A.M.C., Advanced Operative Surgery, 5th (Mhow) Division: Captain H. L. Howell, R.A.M.C., Prevention of Disease, Ahmednagar.

"*Transfers.*—Major C. T. Samman, R.A.M.C., has been transferred from the 8th (Lucknow) to the 5th (Mhow) Division for duty, and Lieutenant H. H. Blake, R.A.M.C., from the 8th (Lucknow) to the 1st (Peshawar) Division."

POONA.—Major H. O. B. Browne-Mason, R.A.M.C., writes; "The Annual Regatta was an exceptionally successful event this year and the Corps very gallantly maintained the high tradition it has established on the Mutha Mula river. As we were considered rather unusually strong in rowing talent in spite of our small numbers, the Regatta Committee made several changes in the programme of events which seemed at first to bear rather hardly on us. However, as the innovations resulted in some very sporting races and incidentally gave us the chance of bringing off two records we have nothing to grumble about.

"The two principal changes lay in the elimination of the race for Senior Regimental Fours and a complete change in the composition of the crews for the Station Eights. In the latter case the 'Doctors' Eight,' with its fine sporting record was disestablished, the Indian Medical Service Officers being allotted to the Indian Army crew, while our old rivals the Sappers were strengthened by the addition of the British Infantry, affording them a fine field for selection, on paper at all events. In the matter of the fours our Senior crew was paid the very graceful compliment of being selected as it stood, to represent Poona against Madras and Bombay in the Championship Fours.

"The Regatta was held on January 17 and 18, the preliminary heats being rowed off on the 14th and 16th.

"The proceedings opened with a walk over for our crew in the Station Eights as our opponents, the Indian Army, were compelled by a series of misfortunes to scratch



Captain F. T. Turner. Major L. Humphry. Mr. L. A. Fanshawe. Major H. O. B. Browne-Mason. Captain W. C. Smales.

Coach.

Lieutenant J. Startin. Captain M. P. Leahy. Mrs. L. E. L. Parker. Captain J. du P. Langrishe. Captain H. V. Byatt.

Cox

at the last moment; the next heat between the Gunners and the British Service was won by the former after a brilliant finish which warned us that we should have our work cut out in the final.

"In the Junior Regimental Fours which followed, our chances were not very much fancied, as the crew had had many difficulties to contend with and were hardly together. Though the Gunners beat us by a length it was a good race and we made them go all the way. The crew was, bow, Dunn; 2, Bowen; 3, Smales; stroke, Browne-Mason; cox, Mrs. Parker.

"The next day Bowen scored a very popular victory in his heat of the Junior Sculls and though he was unable to repeat the performance in the finals he made a very sporting effort.

"Leahy gave us an excellent start in the Regatta events proper by winning the Senior Sculls by two lengths and covered the ½-mile course in the fine time of 4 min. 59 sec. The Madras representative had a big reputation and Leahy's very decisive win was a good augury. It was a great disappointment to all the Corps that our Lady Champion was prevented by illness from turning out for the mixed canoe race, but her partner Turner was allowed to make a post entry with a less experienced water-woman, and just managed to win by a foot. It is rumoured that if he dares to enter for this event again he will be relegated to a punt.

"We finished the day as well as we had begun by winning the final of the Station Eights. We had a splendid race with the Gunners, for though we were nearly clear of them at the end of the first quarter of the mile, they rowed with great determination and grit and had cut our lead down by a half at the half-mile post. All along the last quarter they chased us home, but Langrishe refused to be bustled and brought us in nicely a quarter of a length to the good, in the same time as last year 4 min. 17 sec. It was a splendid race and we were in great fettle at bringing it off, as it is the first time that an exclusively Royal Army Medical Corps Eight has rowed on these waters. Mrs. Parker coxed the boat most pluckily and well, the remainder of the crew being: bow, Smales; 2, Browne-Mason, 3, Humphry; 4, Startin; 5, Turner; 6, Byatt; 7, Leahy; and stroke, Langrishe. Turner, who was having a very pleasant Regatta, scored our first success on the last day. He was rowing third in the British Service Four, which won very easily from the Indian Service Four. Apart from our own special interest, the next race, the Championship Fours, was the most important of the Regatta. The Poona crew, all Royal Army Medical Corps men as already mentioned, was composed as follows: bow, Startin; 2, Byatt; 3, Leahy; stroke, Langrishe; cox, Rev. T. Bridges. They had been well coached and were beautifully together, and the dash and finish they showed in the paddle down to the start gave great promise of a good performance From the start the Madras crew got well away and were signalled as leading by a length at the end of the first quarter-mile. At the half-mile they were still nearly clear, but the Poona crew were beginning to come up, while Bombay was already out of the race. The next quarter saw Poona gradually reducing the distance between the boats, till Madras only led half a length at the ¾-mile, a spurt on their part quite failing to make any impression. As it died away Langrishe saw his chance and called on his crew for a big effort. They responded like one man, and going right away won in great style by a length and a half with the Madras crew completely rowed out. The experts were very enthusiastic over the excellent judgment Langrishe had shown throughout the race and the fine manner in which the whole crew had kept together and backed him up. The time given for the mile was 6 min. 19 sec.

"The last event was the Senior Pairs, in which the Royal Army Medical Corps were represented by Leahy and Langrishe, while Turner partnered Wilson, the deservedly popular Honorary Secretary of the Royal Connaught Boat Club. As the former had just had a very punishing race they were rather heavily handicapped, and Wilson and Turner making no mistake, secured a very popular victory by a length and a half.

"Surgeon-General Sloggett and the Officers, Royal Army Medical Corps were 'At Home' on the last day of the Regatta, and all Poona and Kirkee turned out. The prizes were given away by Mrs. Alderson, the wife of our sporting Divisional General Officer Commanding, and the usual Rosherville Dinner and Dance brought a very delightful event to a fitting conclusion."

NOTES FROM MHOW.—Major Samman writes: "Colonel C. F. Willis, V.H.S., I.M.S., P.M.O., 5th Division, has departed on leave, much regretted by all. A farewell dinner was given at the Club of Central India by Lieutenant-Colonel G. E. Hale and Officers, Royal Army Medical Corps and Indian Medical Service, to Colonel and Mrs. Willis; the wives of the officers and the Nursing Sisters were also present as guests.

"Lieutenant-Colonel G. E. Hale, D.S.O., has arrived from England and taken over command of Station Hospital, and is also officiating Principal Medical Officer.

"Major C. T. Samman has arrived from 8th Division, and has taken over command of Section Hospital. He has been appointed Specialist in Psychological Medicine for Southern Army, also Hon. Secretary and Treasurer, St. John Ambulance Association, Mhow, and Hon. Secretary, Club of Central India.

"Captain F. W. Lambelle has arrived from England, and has taken over the duties of Surgical Specialist, 5th Division, and Consulting Railway Surgeon.

"Lieutenant A. T. J. McCreery on arrival from England is doing duty here, making the total number of Royal Army Medical Corps officers in the Station up to ten.

"Major E. W. Bliss has left for Quetta to take up the duties of Surgical Specialist, 4th Division; he is a great loss to the station.

"Captain J. H. R. Bond has left this station for Nasirabad. The hot weather has now set in and the ladies are deserting the station in large numbers; for those who remain, amusement is provided in the form of dances, bridge drives, dinner parties, and open-air concerts on the Club lawn.

"There are the usual station gymkana games and a certain amount of pig-sticking.

"The roads around Mhow are very good and a good deal of driving is done. Four-in-hand teams are driven by Inniskilling Dragoons, 'X' and 'Y' Batteries, and a team by Major Samman, R.A.M.C., and Officer Commanding Ammunition Column conjointly."

NOTES FROM LUCKNOW.—Lieutenant-Colonel H. N. Thompson, writes: "The Annual Regatta took place on March 2, 3, and 4, 1911;—

"After the Civil Service Week, very assiduous practice commenced, the Royal Army Medical Corps, Royal Engineers, 74th Punjabis, and the Oudh and Rohilkhund Railway crews rarely being absent for an afternoon. Ladies, too, began to study the art, and large tea parties on the Club Chabuttra became the custom.

"The events were as follows: Challenge fours; challenge pairs; junior pairs; senior and junior sculls; ladies' fours; ladies' double skulls: and mixed double sculls. The preliminary heats, and semi-finals, were rowed off on the first two afternoons, and the finals on March 4. The Oudh and Rohilkhund Railway proved the winners of the challenge fours, defeating the Royal Army Medical Corps in the final by a length. The Royal Army Medical Corps carried off the challenge pairs from the Royal Engineers. At the conclusion of the racing the prizes were given away by Mrs. MacNeece. The ladies' fours were a special feature of the meeting, it being the first time on record here that such a race has figured on the programme. Our crew for the challenge fours showed good form, and were well together in practice; but, I think, were rather stale, and fell to pieces when called on to row a quicker stroke than they had been accustomed to do. Mr. and Mrs. Way, I.C.S. (Deputy Commissioner), were 'At Home' on the 3rd.; and Colonel Swayne, and the officers Royal Engineers (both in civil and military employ), dispensed hospitality on the concluding day. In the evening, the officers of the Royal Army Medical Corps gave the usual Rowing Dinner in their Mess, thirty sat down. The old toasts were honoured, and the new Challenge Cup (this time presented by the Royal Army Medical Corps) duly christened according to ancient custom. Although we had been beaten in the final for the challenge fours (which heat, by the way, was rowed in record time), yet we found consolation in having recovered the handsome trophy for the challenge pairs. The Royal Engineers pair, Captains Gardiner and Stack (who won last year), being well beaten in the final by our representatives, Captains C. G. Browne and W. I. Thompson, who were steered to victory by Miss Mactavish, Q.A.M.N.S.I.

"Miss Rait, Q.A.M.N.S.I., left on the 8th instant for a well-earned year's furlough. This lady, by her singular devotion, and unsparing self-sacrifice, has earned the love and respect of all ranks here in quite a remarkable degree. She was entertained to a farewell dinner at the Royal Army Medical Corps Mess, when her health was drunk with musical and Highland honours, and a handsome loving cup, suitably engraved, was presented by Lieutenant-Colonel Thompson on behalf of the officers of the Royal Army Medical Corps, Lucknow.

"Captain Corridon and the members of the I.S.M.D. also presented her, before leaving the station, with a beautiful silver flower bowl, in token of their appreciation of her devotion and never-failing courtesy. We have also lost our Surgical Specialist, Major F. E. Gunter, who has been forced to take six months' sick leave to England.

His place has been taken by Captain H. F. Shea, R.A.M.C., from Umballa. At the Point-to-Point races recently held here to wind up the paper-chase season, Lieutenant T. McPhillips, R.A.M.C., carried off the 'pony cup' with his pony 'Golden Star,' ridden by Captain T. B. Moriarty, R.A.M.C."

PROMOTIONS.

STAFF-SERJEANT.

8714	Serjeant ..	Walsh, A. S. ..	18.3.11	Special under para. 351, K.Reg.

DISCHARGES.

6583	Qmr. Serjt.	Carter, J.	7.4.11	After 3 months' notice.
11240	Lce.-Corpl.	Lawrence, A. ..	3.4.11	Under Art. 1058 (11) R.W.
8713	Private ..	Barnes, R.	17.3.11	Termination of second period.
848	,, ..	Carey, E. A. ..	25.3.11	Medically unfit.
5029	,, ..	Taylor, W. T. ..	4.4.11	,, ,,
1817	,, ..	Hicks, G. V. ..	3.4.11	,, ,,
19817	,, ..	Painter, V. S. ..	24.4.11	,, ,,

TRANSFERS TO ARMY RESERVE.

18472	Pte.	Waller, G. ..	11.3.11	2188	Pte.	Smithers, A.	23.3.11
1767	,,	Hender, G. H...	17.3.11	18658	,,	Gardner, E. R...	31.3.11
18483	Cpl.	Goldfinch, H. C.	15.3.11	1783	,,	Simpson, V. C...	26.3.11
1758	Pte.	Jeffcott, J. ..	13.3.11	1778	,,	Donaldson, K. J.	25.3.11
18498	L.-Cpl	Ross, E. R. ..	15.3.11	1796	,,	Bell, H... .	31.3.11
18485	Pte.	Morey, W. ..	15.3.11	18537	,,	Strong, A. ..	29.3.11
18491	,,	Mann, F. ..	16.3.11	1788	,,	Hazell, J. ..	29.3.11
1763	,,	Morton, G. ..	16.3.11	1789	,,	Postons, F. A. ..	29.3.11
1822	,,	Hancliff, J. E...	15.3.11	1784	,,	Good, W. J. ..	27.3.11
1766	,,	Hook, W. S. ..	17.3.11	18570	,,	Hart, J... ..	30.3.11
1761	,,	Buckell, A. J. ..	16.3.11	18538	Cpl.	Crandler, E.J.W.	29.3.11
1760	,,	Moore, F. ..	15.3.11	18544	Pte.	Branchett, E. T.	30.3.11
18477	,,	Leary, P. ..	12.3.11	1794	,,	Tod, H.	30.3.11
18504	,,	Hall, W. J. ..	18.3.11	18536	,,	Williams, J. D.	29.3.11
1753	,,	Aitken, A. ..	12.3.11	12417	,,	Weller, S. ..	1.3.11
18484	,,	Scott, G. C. G...	15.3.11	18533	L.-Cpl.	Crook, R. ..	2.4.11
18075	,,	Cummings, C. G	17.3.11	18553	Pte.	Abnett, G. H. ..	1.4.11
1768	,,	Sturrock, R. R.	19.3.11	1802	,,	Compton, H. ..	3.4.11
1777	,,	Auston, A. ..	20.3 11	1806	,,	Liddicoat, W. J.	5.4.11
1769	,,	Watt, J... ..	19.3.11	1801	,,	Cameron, A. ..	3.4.11
1774	,,	Ashton, A. M. ..	23.2.11	1807	,,	Cahill, W. ..	7.4.11
18529	,,	Christie, J. ..	25.3.11	18551	,,	Foster, T. W. ..	1.4.11
18516	,,	Reynolds, F. G.	22.3.11	18562	,,	Coombes, A. E.	7.4.11
1778	,,	Blackwell, J. E.	22.3.11	1804	,,	O'Gorman, W...	3.4.11
18541	,,	Rust, J. R. ..	30.3.11				

THE FOLLOWING N.C.O.'S AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS.

FOR STAFF-SERJEANT.

19046	Serjeant ..	Phillips, S. J.	10540	Serjeant ..	Bottomley, G.
10005	,, ..	Hughes, W. T.	16289	,, ..	Hearn, C. G.

FOR SERJEANT.

17794	Corporal ..	Beckett, W. A.	12185	Corporal ..	Willis, A. S.
1831	,, ..	Riley, S. T.	12302	,, ..	Whyte, W.
586	,, ..	Gordon, W. A.	14072	,, ..	Benham, R. R
16185	,, ..	Mayo, W. C. H			

FOR CORPORAL.

17680	Private ..	Lenihan, T.	1116	Private ..	Lockwood, J. W.
1276	,, ..	Cooper, H.	19385	,, ..	Johnson, H.
14445	,, ..	Smith, W. E.	4764	,, ..	Pritchard, J.
1894	,, ..	Benzafield, H. J.	4808	,, ..	Foggin, W.
1940	,, ..	Turner, J. E.			

DEATH.

8861	Serjeant ..	Darling, G... ..	30.3.11	At Ketley.

DISEMBARKATIONS FROM ABROAD.

FROM EGYPT, PER H.T. "SOUDAN," MARCH 23, 1911.

8040	S.-Major ..	Jones, L.	795	Private ..	Hunt, H. H.
12873	Serjeant ..	Godden, G.	19845	,, ..	Reynolds, A. J.
18657	Corporal ..	Tripp, V.	990	,, ..	Tasker, S. E.
18759	Lce.-Corpl.	Bogosoff, F. J.	19427	,, ..	Vidler, C. E.
12751	,, ..	Carter, T. B.	5258	Boy ..	Dring, B. C.
19343	Private ..	Bradley, S. E.	12721	Serjeant ..	Baldwin, A. W. C.
19851	,, ..	Claydon, P. E.	155	Private ..	Carter, S. J.
18329	,, ..	Davidson, F. G.	10590	S.-Serjt. ..	Elliott, J. W.

FROM SIERRA LEONE, PER S.S. "NIGERIA," MARCH 15, 1911.

12104	Serjeant ..	Newton, J. E.	18873	Private ..	Spiers, W.
18648	Lce.-Corpl.	Haley, J.	1936	,, ..	Cartwright, T.

FROM MALTA, PER H.T. "SOUDAN," MARCH 23, 1911.

9694	Corporal ..	Wicks, H.	19432	Private ..	Parker, A. T.
18666	Lce.-Corpl.	James, J.	19036	,, ..	Gibbons, W.
19366	Private ..	Spurrell, F.	18904	,, ..	Aarons, S.
19102	,, ..	Hughes, H. C.	205	,, ..	Blake, F. A.
18825	,, ..	Monaghan, J.			

FROM SIERRA LEONE, PER S.S. "ARO," MARCH 22, 1911.

16640	Serjeant ..	Kildea, R.	14924	Corporal ..	Forbes, J.

FROM GIBRALTAR, PER H.T. "SOUDAN," MARCH 23, 1911.

18496	Corporal ..	Emery, W.			

FROM JAMAICA, PER S.S. "THAMES," APRIL 3, 1911.

19384	Private ..	Howard, W.			

Serjeant W. J. Webster rejoined the Corps from the Medical Department of Northern Nigeria, on April 10, 1911.

Serjeant F. Knott has been selected for employment as Medical Dispenser in the East Africa Protectorate, and embarked on April 21, 1911.

Mr. Hutton, late Serjeant-Major, and Serjeant R. Wilson have been selected for employment as Sanitary Inspectors on the Gold Coast.

SPECIAL RESERVE OF OFFICERS.

ROYAL ARMY MEDICAL CORPS.

The undermentioned Lieutenants have been confirmed in their rank: Keith B. MacGlashan, M.B., Aubrey G. Brown, Philip W. Mathew.

To be Lieutenants (on probation): Sydney James Higgins, dated February 15, 1911; Philip Seston Vickerman, M.B., dated March 2, 1911; Robert Howard Nolan, M.B., dated March 7, 1911; William Biden, M.B., dated March 31, 1911.

TERRITORIAL FORCE.

YEOMANRY.

Westmoreland and Cumberland Yeomanry.—Surgeon-Lieutenant John Livingstone, M.B., to be Surgeon-Captain, dated February 10, 1911.

INFANTRY.

6th Battalion, The Cheshire Regiment.—Surgeon-Captain Eugene C. McCarthy, M.B., resigns his commission, dated March 25, 1911.

ROYAL ARMY MEDICAL CORPS.

3rd Northern General Hospital, Royal Army Medical Corps.—James Martin Beattie, M.D., to be Major, dated January 2, 1911.

1st Scottish General Hospital, Royal Army Medical Corps.—Ashley Watson Mackintosh, M.D. (late Major, 1st Highland Field Ambulance, Royal Army Medical Corps), to be Lieutenant-Colonel, whose services will be available on mobilisation, dated February 25, 1911.

4th Scottish General Hospital, Royal Army Medical Corps.—Captain James Weir, M.B., retires under the provisions of paragraph 75 of the Territorial Force Regulations, dated March 25, 1911.

1st Eastern General Hospital, Royal Army Medical Corps.—Acting-Serjeant-Major Reginald Hector Porter, to be Quartermaster, with the honorary rank of Lieutenant, dated April 5, 1911.

1st Northumberland Field Ambulance, Royal Army Medical Corps.—Lieutenant William Thomas Harkness, from the List of Officers attached to Units other than Medical Units, to be Lieutenant, dated March 1, 1911.

Officers attached to other Units.

Captain Cecil A. Corke resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated March 18, 1911.

Robert Henry to be Lieutenant, dated January 9, 1911.

Lieutenant Thomas Price Thomas to be Captain, dated February 16, 1911.

Captain John G. Ronald, M.B., resigns his commission, dated March 22, 1911.

Captain Andrew R. Wilson, M.D., to be Major, dated July 4, 1910.

Lieutenant John A. Nixon, to be Captain, dated December 22, 1910.

Bernard Richardson Billings, to be Lieutenant, dated March 1, 1911.

Francis Vincent Denne, to be Lieutenant, dated March 16, 1911.

Lieutenant Samuel English, M.B., to be Captain, dated September 30, 1910.

Captain James S. Swain, to be Major, dated October 28, 1910.

Captain Albert Ehrmann, to be Major, dated January 9, 1911.

Hugh Lennox Munro, M.D., to be Lieutenant, dated March 1, 1911.

Richard Patrick Ryan (late Lieutenant, 2nd Prince of Wales) Volunteer Battalion, the Devonshire Regiment, to be Lieutenant, dated February 1, 1911.

Captain Alexander Weatherhead French, from the Yorkshire Mounted Brigade Field Ambulance, Royal Army Medical Corps, to be Captain, dated March 15, 1911.

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

The following ladies have received appointments as Staff Nurse: Miss J. F. Watson, Miss M. E. B. Eyton, Miss E. E. Hopcraft.

Postings and Transfers.—Matrons: Miss S. E. Oram, R.R.C., to South Africa, from Netley. Sisters: Miss M. O'C. McCreery, to Woolwich, on return from Gibraltar; Miss E. M. Denne, to Pretoria, from Wynberg; Miss E. M. Robinson, to Connaught Hospital, Aldershot, on return from Malta; Miss M. Walker, to Wynberg, from Pretoria; Miss E. H. Hay, to Netley, from Connaught Hospital, Aldershot; Miss C. G. Stronach, to the Queen Alexandra Military Hospital, Grosvenor Road, London, S.W., from Chatham; Miss S. Lamming, to Chatham, from Netley; Miss E. K. Kaberry, to Devonport, from Egypt. Staff Nurses: Miss C. C. M. Gibb, to Hong Kong, from Netley; Miss J. Mc. P. B. Smith, to Connaught Hospital, Aldershot, from the Queen Alexandra Military Hospital, Grosvenor Road, London, S.W.; Miss K. E. Hearn, to Hounslow, from Cambridge Hospital, Aldershot; Miss M. O. Greenaway, to the Queen Alexandra Military Hospital, Grosvenor Road, London, S.W., from Tidworth; Miss N. Molloy, to Tidworth, from Connaught Hospital, Aldershot; Miss E. K. Parker, to Dublin, from Hounslow; Miss C. V. E. Thompson, to Cambridge Hospital, Aldershot, on appointment; Miss E. E Hopcraft, to Cambridge Hospital, Aldershot, on appointment; Miss J. F. Watson, to Netley, on appointment.

Promotions.—The undermentioned Staff Nurses to be Sisters; Miss M. C. E. Newman, Miss F. M. Tosh.

Arrivals.—Miss M. Davis, Sister, from Egypt; Miss E. K. Kaberry, Sister, from Egypt; Miss E. M. Robinson, Sister, from Malta.

ROYAL ARMY MEDICAL CORPS FUND.

PROCEEDINGS OF A COMMITTEE MEETING HELD AT THE WAR OFFICE ON WEDNESDAY, APRIL 12, 1911, AT 2.30 P.M.

Present.

Surgeon-General W. L. Gubbins, C.B., M.V.O., in the chair.
Surgeon-General W. Donovan, C.B.
Surgeon-General W. Babtie, V.C., C.M.G.
Colonel A. Peterkin.
Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.
Lieutenant-Colonel E. O. Wight.
Colonel E. J. Risk.
Major E. M. Pilcher, D.S.O.
Major A. Bruce.
Major E. T. F. Birrell.
Captain L. Cotterill.

(1) The Minutes of the last meeting were read and confirmed.

(2) It was noted that the following grants were received from Companies for the quarter ending March 31, 1911, for the General Relief Fund:—

No. 7	Company,	Devonport	£5	13	0
,, 9	,,	Colchester	3	0	0
,, 16	,,	Cork	3	0	5
,, 19	,,	Chester	4	18	6
,, 26	,,	Ceylon	5	0	0
,, 28	,,	Gibraltar	6	0	0
,, 35	,,	London	5	0	0
			£32	11	11

(3) The following Grants from the General Relief Fund for the past quarter were considered and approved, and a list of recipients is attached:—

Name	Age	District	Grant	Total	Remarks
Mr. E. P. ..	59	Netley ..	£1	£4	Suffers from paralysis.
Mrs. N. S. ..	69	London ..	£4	£4	Old age. Unable to work.
Mrs. M. A. ..	30	,, ..	£1	£2	Poverty, owing to ill-health.
Mr. J. W. ..	46	York ..	£4	£8	Suffers from tuberculosis.
Mrs. S. G. ..	28	Tidworth ..	£3	£3	Widow expecting confinement.
Mrs. E. M. W...	40	Aldershot ..	£2	£9 10s.	Insufficient means.
Mrs. K. H. ..	51	Devonport	£3	£3	Destitute. In poor health.
Mr. C. G. ..	36	Woolwich	£4	£4	Suffers from tuberculosis.
Mrs. F. M. S. ..	28	Dublin ..	£4	£8	Poverty.
Mr. F. W. F. ..	39	London ..	£1	£1 10s.	Destitute and out of work.
Mrs. F. A. H. ..	57	Jersey ..	£3	£3	Destitution.
Mr. T. G. A. ..	59	London ..	£4	£5	Old age. Unable to work.
Mr. J. W. ..	55	Aldershot ..	£2	£2	Out of work.
Mrs. M. L. ..	27	Edinburgh	£4	£4	No means of support. Four young children.
Mr. C. M. ..	61	Woolwich	£4	£4	Destitute. Unable to work.
Mrs. J. M. G. ..	42	Colchester	£4	£12	Suffers from ill-health.
Mrs. F. S. ..	39	Portsmouth	£4	£16	Has five children to support.
Mr. H. S. ..	46	Aldershot ..	£2	£4	Requires assistance to take up an appointment.
Mrs. D. G. ..	52	London ..	£4	£8	No means of support.
Mr. C. W. A. ..	65	Woolwich	£4	£6	Old age. Sickness.
Mr. J. W. ..	55	Aldershot ..	£2	£4	Out of work.
Mr. W. P. B. ..	70	London ..	£2	£2	Ill-health and out of work.
Mrs. J. F. ..	40	Belfast ..	£4	£4	Lately a widow. Three children.
Mrs. M. A. B. ..		London ..	£3	£3	To assist in paying debt.
Mrs. J. F. ..	25	Edinburgh	£1	£4	In distressed circumstances.

(4) The Aldershot Band accounts were considered and approved, and are appended to these minutes.

STATEMENT OF THE ROYAL ARMY MEDICAL CORPS BAND ACCOUNTS.

For Quarter ending March 31, 1911.

Receipts.

	£	s.	d.
Balance Credit brought forward	8	14	6½
Officers' Subscriptions (Aldershot)	16	7	6
Secretary R.A.M.C. Fund (Quarterly Grant)	80	0	0
Three Officers' Subscriptions	0	15	0
	£105	17	0½

Expenditure.

	£	s.	d.
Bandmaster's Salary	30	0	0
Band Pay	44	7	4
Gloves for Bandmaster	0	4	6
Hawkes & Son, Music and Repairs	15	9	3
Boosey & Co., ,, ,,	3	17	7
Breitkopf & Haertel, Music	0	10	0
Recruiting Reward and Expenses (Serjeant-Bugler)	0	14	6
Expenses fitting Sash (Serjeant-Drummer)	0	3	5
Marking new Music Stands	0	5	0
Master-Tailor, altering Tunics	2	9	6
Electric Light Charges	0	8	4
Stationery	1	11	0
Postage	0	3	6
Advanced for Band Engagements	5	2	5
Boosey (Music)	0	3	0
Balance at Bank and in hand £20 4 6½			
Less unpresented Cheques 19 16 10			
	0	7	8½
	£105	17	0½

LEONARD COTTERILL, *Captain,*
Band President, R.A.M.C.

Estimate for Quarter ending June 30, 1911.

	£	s.	d.
Balance Credit	0	7	8½
Estimated Aldershot Subscriptions	19	0	0
Probable Grant required	93	15	3½
	£113	3	0

	£	s.	d.
Estimated expenditure under all heads	113	3	0
	£113	3	0

A grant of £95 was made towards the current quarter's expenses. It was resolved that the Principal Medical Officer, Aldershot, be asked to allow the Audit Committee to audit the accounts quarterly.

(5) The Report of the Dinner Sub-Committee was considered adopted, and is attached hereto.

REPORT FOR SUBMISSION TO THE GENERAL COMMITTEE ROYAL ARMY MEDICAL CORPS FUND.

(i) The Sub-Committee of the Royal Army Medical Corps Dinner Fund report that the Dinner for 1910 was cancelled owing to the lamented death of H.M. King Edward VII.

(ii) That the Dinner this year is to be held at Prince's Restaurant (Picture Rooms), 191, Piccadilly, on June 12, at 8 p.m.

(iii) That the number of members who continued during the past year to subscribe to the old Dinner Fund was thirty-eight.

(iv) That they recommend the charge for tickets to subscribers be 7s. 6d. and to non-subscribers 32s. 6d., a grant being voted from the Royal Army Medical Corps Fund to defray the amount.

(v) That Colonel Wardrop having retired, Lieutenant-Colonel A. P. Blenkinsop, Royal Army Medical College, has been appointed to fill the vacancy on the Sub-Committee.

(vi) That they recommend that the amount allowed to Mr. Dainty for clerical work be increased from £2 to £3. In view of the good work performed by him in this connection since 1905, and the increase of work from the large numbers now dining.

(6) It was noted that Mr. G. has been admitted to the Brompton Consumption Hospital on the in-patient ticket granted to the Fund for its subscription.

F. W. H. DAVIE HARRIS, *Lieutenant-Colonel,*
Secretary.

ROYAL ARMY MEDICAL CORPS FUND.

NOTICE OF THE NINTH ANNUAL GENERAL MEETING.

The Ninth Annual General Meeting of Subscribers to this Fund will be held in the Theatre of the Royal Army Medical College, Grosvenor Road, S.W., at 2 p.m., on Monday, June 12, 1911. The Director-General will preside. It is to be hoped that officers will freely express their views on any point connected with the Fund. Those officers who may wish for information on any special point are requested to communicate with the Secretary at 10, Comeragh Road, W., so that information may be furnished in response to any question asked.

F. W. H. DAVIE HARRIS, *Lieutenant-Colonel,*
Secretary.

ARMY MEDICAL OFFICERS' BENEVOLENT SOCIETY.

PROCEEDINGS OF A COMMITTEE MEETING HELD AT THE WAR OFFICE ON WEDNESDAY, APRIL 12, 1911, AT 3.15 P.M.

Present.

Surgeon-General W. L. Gubbins, C.B., M.V.O., Chairman, in the chair.
Surgeon-General W. Donovan, C.B.
Colonel A. Peterkin.
Colonel Sir James Clarke, C.B., Bt.
Colonel Lane Notter.
Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.
Major E. T. F. Birrell.

(1) The minutes of the last meeting were read and confirmed.

(2) An application for a grant was read from the widow of the late Lieutenant-Colonel H. J. P. for her two orphan daughters. It was resolved that a grant of £25 be made.

(3) Sanction was given for two special grants of £5 each made by the Secretary to the orphan daughters of the late Surgeon W. K. O'R. and Surgeon-General T. B.

(4) The Committee considered the application for grants for recommendation to the Annual General Meeting, which will be published when approved.

(5) The following report for the year 1910 was approved:—

REPORT OF THE COMMITTEE FOR THE YEAR 1910.

The number of subscribers for the year was 175.

The receipts for the year amounted to £1,003 9s. 6d., and the expenditure to £860 18s. 9d.

Grants were made to twenty-seven applicants representing thirty-nine orphans.

A legacy of £100 was received from the estate of the late Surgeon-General Sir J. Mouat, V.C.

£128 3s. 9d. consols at 81½ were purchased at an expenditure of £105 3s. 9d.

The question of amending Rule IV was discussed, and it was resolved not to alter the Rule.

F. W. H. DAVIE HARRIS, *Lieutenant-Colonel,*
Secretary.

ARMY MEDICAL OFFICERS' BENEVOLENT SOCIETY.

The Annual General Meeting of the Subscribers to the above Society will be held in the Theatre of the Royal Army Medical College, Grosvenor Road, S.W., at 3 p.m., on Monday, June 12. Those officers who wish for information on any special points are requested to communicate with the Secretary, Lieutenant-Colonel F. W. H. Davie Harris, 10, Comeragh Road, W., so that information may be furnished in response to any question asked.

F. W. H. DAVIE HARRIS, *Lieutenant-Colonel,*
Secretary.

ROYAL ARMY MEDICAL COLLEGE.

LIST OF BOOKS ADDED TO THE LIBRARY DURING THE MONTHS OF JANUARY, FEBRUARY AND MARCH, 1911.

Title of Work and Author	Edition	Date	Source obtained
Manual of Bacteriology. By Muir and Ritchie ..	5th	1910	Library Grant.
The Treatment of Syphilis by the Ehrlich-Hata Remedy "606." By Johannes Bresler	2nd	1910	Editor, Journal.
Military Law made Easy. By Lieutenant-Colonel S. T. Banning	5th	1910	,, ,,
Medical Diagnosis. By W. M. Stevens, M.D. ..	..	1910	,, ,,
Manual of Clinical Pathology. By R. Weiss ..	2nd	1910	,, ,,
Hæmoglobinuria. By A. E. L. Charpentier ..	..	1910	,, ,,
The Prevention of Malaria in the Federated Malay States. By Malcolm Watson, M.D. With a Preface by Ronald Ross, C.B., M.D., F.R.S.	..	1911	Liverpool School of Tropical Medicine.
Merck's Index. 3 Auflage	..	1910	Editor, Journal.
The Diseases of China, including Formosa and Korea. By Jefferys and Maxwell	..	1910	,, ,,
Report on the Health of the Army for the Year 1909	..	1910	War Office.
The Fauna of British India, including Ceylon and Burma. Edited by Shipley and Marshall			
Rhynchota. Vol. v. Heteroptera: Appendix. By W. L. Distant	..	1910	Secretary of State for India.

LIST OF BOOKS ADDED TO LIBRARY.—*Continued.*

Title of Work and Author	Edition	Date	Source obtained
The Bradshaw Lecture on Cancer. By Sir A. P. Gould	..	1910	Editor, Journal.
Guy's Hospital Reports. 3rd series, vol. xlix. Edited by Steward and French	..	1910	,, ,,
Feeblemindedness in Children of School Age. By C. P. Lapage, M.D. With an Appendix on Treatment and Training by Mary Dendy, M.A.	..	1911	Victoria University, Manchester.
Führer durch das Medizinische Wien Geschichte und Organisation. Von Dr. Adolf Kronfeld	..	1911	
Statistical and General Report of the Army Veterinary Service for 1909	..	1910	Editor, Journal.
Transactions of the Congress of American Physicians and Surgeons. Vol. viii	..	1910	Commandant's Office.
Year Book of the Royal Society, 1911	..	1911	Royal Society.
Public Health Laboratory Work. By Henry R. Kenwood	5th	1911	Editor, Journal.
Scientific Memoirs by Officers of the Medical and Sanitary Departments of the Government of India. New Series. No. 39.			
The Applicability to Medico-Legal Practice in India of the Bio-Chemical Tests for the Origin of Blood-stains. By Lieutenant-Colonel W. D. Sutherland, I.M.S.	..	1910	Superintendent of Government Printing, Calcutta.
Do. do. New series. No. 40			
The Destruction of Fleas by Exposure to the Sun. By Captain J. Cunningham, I.M.S.	..	1911	,,
The Third Annual Report of the Commissioner of Health of the Commonwealth of Pennsylvania	..	1909	Editor, Journal.
St. Bartholomew's Hospital Reports. Vol. xlvi. 1910. Edited by Fletcher and Eccles	..	1911	,, ,,
Handbook of Treatment for Diseases of the Eye (Ophthalmic Therapeutics). By Dr. Curt Adam. With a Preface by Professor von Michel, Berlin. Translated from the second German Edition (1910) by W. G. Sym and E. M. Lithgow	..	1911	,, ,,
Aids to Bacteriology. By Moor and Partridge ..	2nd	1911	,, ,,
Practical Bacteriology, Blood Work and Parasitology. By E. R. Stitt, A.B., M.D.	2nd	1911	,, ,,
New South Wales. Report of the Government Bureau of Microbiology for 1909	..	1910	,, ,,
Military Sanitation and Hygiene. By E. Blake Knox, Captain R.A.M.C.	..	1911	,, ,,
Reminiscences. By George Saunders, C.B., M.D.	..	1907	Presented by the Director-General.

THE ROYAL ARMY MEDICAL CORPS MESS, LONDON.

QUESTION OF A GENERAL CONTRIBUTION TO THE MESS.

At the General Meeting of the Corps Fund in 1910, a sub-committee was appointed to advise on the question of a general contribution from the officers of the Corps to the Royal Army Medical Corps Mess, London. The sub-committee met on July 22, 1910. The members were Colonel D. Wardrop, C.V.O., Major D. Lawson (Netley), Major T. W. Gibbard (India), Major G. T. Rawnsley (Aldershot), Lieutenant-Colonel C. T. Blackwell (Woolwich), and Brevet-Lieutenant-Colonel A. P. Blenkinsop as secretary.

The sub-committee unanimously recommended:—

(1) That an annual subscription of half a day's pay should be made by all officers, Royal Army Medical Corps, not members of other established Royal Army Medical Corps Messes, to the Royal Army Medical Corps Mess, London, for maintenance, and the formation of a reserve fund.

(2) That in the event of other established Royal Army Medical Corps Messes requiring a grant in aid, the head-quarters Mess be empowered to make the same, if funds are available.

As this question affects all officers of the Corps, whether they are subscribers to the Corps Fund or not, opportunity will be taken to bring it up for discussion on June 12, 1911, in the theatre of the Royal Army Medical College, immediately after the conclusion of the next General Meeting of the Corps Fund; all officers interested are invited to be present.

THE ARMY MEDICAL OFFICERS' WIDOWS' AND ORPHANS' FUND.

ANNUAL GENERAL MEETING.

The Annual General Meeting to receive the Annual Report of this Society, and to elect members of the Committee, will be held in the Library of the Royal Army Medical College, Grosvenor Road, on Tuesday, May 30, 1911, at 3.30 p.m.

The Director-General will take the Chair. A special meeting as directed by Rule XLVI. will be held immediately afterwards to consider the Actuary's Report on his quinquennial valuation of the funds of the Society and the recommendations of the Committee in accordance with Rule X.

New rules having been adopted in 1906, the attention of officers of the Corps who wish to make some provision for their widows and orphans, on the most advantageous terms, is invited to the benefits now offered by the above Fund.

The benefit provided by the Society to the subscriber's widow, under his marriage subsisting at the date of commencement of his subscription as a married member, is £50 per annum during widowhood, with the continuance of the annuity, during re-marriage of the widow or after her death, to the child or children of the said marriage until such child, or the youngest of such children, shall have attained the age of 21 years. Furthermore, should the wife of the subscriber predecease him, it will be optional for him to continue until his death, the subscription he had been paying as a married member, in order to provide an annuity similar to the above for the children of the marriage, until the youngest shall have attained the age of 21 years.

A detailed table of rates of subscription will be found at the end of the Rules, which together with the Actuary's Report, Declaration Forms and other details, can be obtained from the Secretary, Captain J. T. Clapham, 20, Belgrave Road, S.W.

ANNUAL DINNER.

The Annual Dinner of the officers of the Royal Army Medical Corps will take place on Monday, June 12, 1911, in the "Picture Rooms," Prince's Restaurant, Piccadilly, W., at 8 o'clock precisely. *President:* The Director General.

The price of dinner tickets to subscribers will be 7s. 6d., and to non-subscribers £1 12s. 6d.

It is particularly requested that applications for tickets, both by subscribers and non-subscribers, should be made as early as possible, in order that the number attending may be approximately known. Non-subscribers when applying for tickets should forward the sum of £1 12s 6d. by cheque, or P.O.O., made payable to the Honorary Secretary. From subscribers, the price of the dinner ticket will be collected at Prince's Restaurant on the night of the dinner.

The following officers will be regarded as subscribers:—

(1) All existing subscribers to the old Royal Army Medical Corps Dinner Fund, provided that they have paid their subscriptions to that Fund for this year.

(2) All Subscribers to the Royal Army Medical Corps Fund,[1] provided that their subscriptions are credited to the Fund before the date of the dinner.

[1] Any officers who may have specially excluded the Annual Dinner in the allocation of their subscription will of course be excepted.

Selected instrumentalists from the Royal Army Medical Corps band, Aldershot, will play during dinner.

A plan of the tables will be on view at the Restaurant on the day of the dinner, in order that officers desirous of doing so may select the places at which they wish to sit.

N.B.—It is notified that the Monday in Ascot week has been retained as the day on which the dinner will be held each year. Miniature medals will be worn.

2, *Sutherland House*,
Cheniston Gardens,
Kensington, W.

E. T. F. BIRRELL, *Major, R.A.M.C.*
Hon. Secretary.

THE EMPRESS MARIE FÉODOROVNA FUND.

We have received the following communication from the Secretary of the British Red Cross Society.

The above Fund was founded during the Seventh International Red Cross Conference, held at St. Petersburg, in 1902, by Her Imperial Majesty the Empress Marie Féodorovna, the august protectress of the Russian Red Cross Society, for the purpose of awarding prizes to the authors of the best inventions having for their object the diminution of the sufferings of the sick and wounded in time of war, in accordance with the conditions promulgated in the subjoined statutes of the Fund.

Her Majesty gave 100,000 roubles to create the Fund, with the proviso that the interest accruing thereon should be distributed for the above object at an International Competition to be held every five years.

The first competition for the prizes offered from the Fund was held in London in 1907 in connection with the Eighth International Red Cross Conference organised by the British Red Cross Society. The prizes awarded at that competition amounted to over £2,000.

Arrangements have been made by the American Red Cross Society to hold the next competition concurrently with the Ninth International Red Cross Conference, which will assemble at Washington from May 7 to 17, 1912.

It is expected that the sum available for prizes will amount to about £2,000.

The Central Committee of the Russian Red Cross Society announce that the subjects selected for the next (second) competition for the above prizes are, as follows:—

(1) A scheme for the removal of wounded from the battlefield with the minimum number of stretcher bearers.

(2) Portable wash-stands for use in the field.

(3) The best way of carrying dressings for use in regimental aid posts and dressing stations.

(4) Wheeled stretchers.

(5) Transport of stretchers on mule-back.

(6) Easily folding portable stretcher.

(7) Transport of the wounded between war-ships and hospital ships and the coast.

(8) The best method of heating railway carriages by a system independent of steam from the engine.

(9) The best model of portable Roentgen apparatus for the employment of X-rays on the field of battle at the regimental aid posts.

STATUTES OF THE "EMPRESS MARIE FÉODOROVNA INTERNATIONAL RED CROSS FUND."

(1) The "Empress Marie Féodorovna" International Fund of the Red Cross was established for the purpose of awarding prizes to the authors of the best inventions for alleviating the sufferings of sick and wounded soldiers.

(2) The Funds consist of 100,000 roubles which Her Majesty the Empress Marie Féodorovna, the august protectress of the Russian Red Cross Society, has been graciously pleased to give for this purpose.

(3) The capital of the Fund is to remain intact.

(4) The interest on the capital shall be used for the purpose of awarding prizes to the authors of the best inventions in any one of the following subjects: Searching for and rescuing sick and wounded on the battlefield; the most rapid and comfortable means of transporting sick and wounded to the nearest regimental aid-post and for

their ultimate evacuation; generally for the best ways and means of helping sick and wounded either on the battlefield or in rear of the army.

(5) The care of the Fund and its administration is vested in the Executive Committee of the Russian Red Cross Society.

(6) The date of distribution of prizes, the subjects for which they will be awarded (within the scope mentioned in Article 4), the number and amount of the prizes, as well as the other details of the competitions, will be fixed at each International Red Cross Conference; this decision will remain in force until the succeeding Conference.

The interval between two successive distributions must not be less than five years.

(7) Only new inventions will be admitted to the competitions for prizes, that is to say, those whose descriptions have not been published before the competition which precedes that at which the invention is presented.

(8) In awarding the prizes preference will be given to the inventions which are likely to be of most practical use, and of which the utility has been thoroughly demonstrated by models shown at the competition.

(9) Inventions sent in for the prize competition must be submitted exclusively through the Central Red Cross Committee of each country; these Committees have the right to refuse to admit an invention to the competition. All expenses attaching thereto must be defrayed by the person or Committee presenting the invention.

(10) In case a Red Cross exhibition is organised simultaneously with, and in the same town as the competition, the inventions competing for these prizes must be exhibited as a special section of the exhibition, and at the cost of the persons and institutions which present them.

(11) The awarding of prizes is carried out by a Special International Jury, composed of eight members, two of whom are permanent and are elected, one by the Executive Committee of the Russian Red Cross Society, and the other by the International Red Cross Committee. The other six members are elected by the Central Red Cross Committees of the other countries.

(12) The Seventh International Red Cross Conference designated six Central Red Cross Committees, whose representatives formed part of the jury at the first distribution of the prizes, which took place in 1907. In order to permit all the Central Committees of each country being successively represented on the jury in future, at each new Conference lots will be drawn by representatives of all the Committees which took part in the last award of prizes, to determine two Committees, the representatives of which shall retire and be replaced by the representatives of two other Committees elected by the Conference. The jury itself elects its President, who directs the work of the jury, and on completion forwards all papers and decisions to the jury, as well as all drawings and descriptions presented to it to the Executive Committee of the Russian Red Cross Society, which delivers the diplomas and prizes.

(13) The sums available from the Fund must only be used for the award of prizes, and for expenses having a direct connection with the work of the jury, such as the transfer of money, the preparation of diplomas, &c., the cost of transport to the exhibition of exhibits, and the expenses necessitated by the care of these objects, their exhibition, &c.; any other expenses not having a direct reference to the work of the jury are not to be paid out of the Fund.

(14) If the jury is not satisfied with the results of the competition, it has the right to withhold any part of the sum at its disposal for the awarding of prizes. The balance remaining undistributed will be used to augment the number and amount of the prizes to be awarded at the next competition.

(15) The Central Red Cross Committees of each country must undertake to give the greatest possible publicity to the competitions and their programmes.

(16) Changes in the appropriation of the Fund or in the text of the actual statutes cannot be effected except in virtue of decisions of the International Red Cross Conference, with the approbation of the august protectress of the Russian Red Cross Society.

FAR-EASTERN ASSOCIATION OF TROPICAL MEDICINE: SECOND BIENNIAL CONGRESS, HONG KONG, JANUARY 20 TO JANUARY 27, 1912.

We have received the following communication from the Secretary of the Congress:—

The Second Biennial Congress of this Association will be held in Hong Kong, from Saturday, January 20, to Saturday, January 27, 1912, and your are cordially invited to attend and to take part in the work of the Congress. The Association is an International one, formed to promote the science and art of Tropical Medicine in the Far East.

The fortnightly French mail steamer from Ceylon, Singapore, and Saigon is due to arrive in Hong Kong on Tuesday or Wednesday, January 16 or 17, and the fortnightly English (P. and O.) mail steamer from Ceylon, Penang, and Singapore is due to arrive on Friday, January 19, while there are several mail steamers arriving in Hong Kong each week from the North.

Saturday, January 20, will be devoted to the reception of official delegates and visitors, leaving the whole of the following week for the scientific work of the Congress.

A Scientific Committee has been appointed consisting of: Colonel W. G. Bedford, C.M.G., M.B., P.M.O., *Chairman;* Deputy-Inspector-General J. L. Barrington, R.N.; Charles Forsyth, M.D., F.R.C.S.(Edin.); Oskar Muller, M.D.(Munich); F. Osmund Stedman, M.D.(Lond.), to classify the papers which are offered, so as to give, as far as possible, a day to each of the following groups of subjects: Protozoology, Helmintholology; Cholera, Plague, Leprosy, Tuberculosis; Tropical Fevers, including Malaria, Beri-beri, Dysentery; Surgery, Obstetrics, Infantile Diseases; Climate, Hygiene, Sanitation.

It is requested that a brief abstract of each paper be forwarded to me as soon as convenient, for the information and guidance of this Committee. Papers may be read in either English, French, or German, but authors are asked to send their abstracts in English in all cases.

The subscription to the Association is 10s. 6d ($6 Hong Kong currency), and is due now (1911), but no further subscription will be required until 1913.

A suitable social programme will be arranged for the entertainment of visitors during the Congress.

The average temperature in Hong Kong during the month of January is about 62° F. (17° C.), while its range may extend from 88° F. (27° C.) on a warm day to 40° F. (4·4° C.) during a cold night, so that visitors from more tropical regions should provide themselves with warm clothing.

OBITUARY NOTICES.

HECTOR.

Lieutenant-Colonel James Hector, retired, Army Medical Staff, whose death occurred at Oxford, on March 23, was born at Paterson River, New South Wales, December 12, 1841.

His father was Captain Thomas Hector, who in early life had been an officer in the Royal Navy, but leaving that Service, joined the Merchant Service, and for some years commanded a ship trading between India and China, and he subsequently settled in Australia.

Colonel Hector was educated at Aberdeen, and attended the Arts curriculum at Marischal College, from 1856 to 1860, thereafter studying medicine and graduating M.B., C.M., at the University of Aberdeen in 1864. He joined the Army as Staff Assistant Surgeon September 30, 1864, was appointed Assistant Surgeon of the 54th Foot, September 9, 1871, and served in that Regiment until March 1, 1873, when on the abolition of the regimental medical system, March 1, 1873, he became Surgeon, Army Medical Department. He was promoted Surgeon Major, September 30, 1876, and retired as a Surgeon Major, Army Medical Staff, with the honorary rank of Brigade Surgeon, February 26, 1887. The designation of his substantive departmental rank was altered to that of Surgeon-Lieutenant-Colonel, under *Gazette* notification of October 17, 1893, and he became Lieutenant-Colonel under *Gazette* notification of August 9, 1898.

As a retired officer, he was for many years employed as a Medical Examiner of recruits in the London district, and many old brother officers will recollect that for a considerable time he acted as Honorary Secretary to the Army Medical Annual Dinner.

While on the active list, he served in Malta, India, and South Africa, and latterly was in command of the Depôt and Training School, Medical Staff Corps, Aldershot. He received the thanks of the Commander-in-Chief in India, and of the Director-General, Army Medical Department, for his devoted zeal, during the epidemic of cholera at Murree, in 1876, and in 1884, he was appointed as Honorary Surgeon to His Excellency the Viceroy of India. His services when in command of the depôt of the Medical Staff Corps were warmly eulogised by the Principal Medical Officer on his relinquishing that command in January, 1887.

His war services are recorded in *The Official Army List* as follows:—

South African War, 1879.—Zulu Campaign, with a flying column; Sekukuni campaign, with the Transvaal Field Force at attack and capture of Sekukuni's stronghold. Despatches, *London Gazette*, January 16, 1880. Medal with clasp.

He deserves, however, to be specially remembered as the first British officer who commanded a Bearer Company in action A draft of his report on the improvised Bearer Company, which he organised for service in the Campaign against Sekukuni, in the Transvaal in 1879, was found amongst his papers after his death, and is published in the present number of the Journal. This report, written, as he states, at the suggestion of Colonel Brackenbury (now General Sir Henry Brackenbury, G.C.B.), then chief of the Staff in the Transvaal, will be read with interest as showing the great advance in the administration and position of Army Medical affairs since that time, and in view of the fact that no mention of such an organisation as a Bearer Column or of Bearer Companies is to be found in our Regulations, until the publication of the *Field Hospital Regulations* promulgated by Clause 9 of *Army Circulars* (January), 1878.

Colonel Brackenbury, writing to Hector on December 21, 1879, says: "I have read this report with the greatest interest . . . I shall always consider that the first trial of the Bearer Company system in action with our troops was a thorough and complete success, and I attribute that success first to the inherent excellence of the system, and secondly to the fortunate fact that your knowledge and zeal were brought to bear upon the organisation of this improvised Bearer Company."

In a speech made in the House of Commons on March 1st, 1880, Colonel Stanley, then Secretary of State for War, said: There is another point in connection with the Medical Service to which I should like also to draw your attention. In the recent attack on Sekukuni's fortress the ambulances were for the first time fully organized, and it is satisfactory to know that this was attended by the best results under the direction of Surgeon Major Hector. It is important that I should draw attention to this, because it is a marked feature in field medical organization. I believe I may refer to a letter written by Colonel Brackenbury, who describes more tersely than I can the advantages of the establishment of this column. He says: "It was a sight to see, for I suppose it was the first action fought by our troops in which it can be said that not a single fighting man left the ranks to bear the wounded to the rear. It was a trial, though on a small scale, and I am satisfied that the system is sound. Hector, I hope, will receive the appreciation he deserves." The more official report of the Principal Medical Officer states that so efficiently and rapidly did the corps perform its duty that no wounded man was left two minutes on the ground before he was taken to the dressing station.

We may note that as an appreciation of his valuable services in South Africa, on March 24, 1880, he was offered the charge of the Cambridge Hospital, Aldershot, a position usually held by a Brigade Surgeon, and on May 13, 1880, an intimation was sent to him that "in consequence of the good service rendered by him during the war in South Africa" his name had been placed on the Roster for foreign service, 100 places from the top.

BENT.

Major George Bent, R.A.M.C., retired, who died at Fleet, Hants, on March 3, 1911, was well known to, and will be much regretted by, many officers of the Corps as well as others. Son of the late Lieutenant-Colonel Bent of the K.O.B.'s, he came of a family of soldiers, of whom two served in the Peninsular, and five in the Crimea.

He was educated at Derby Grammar School and St. Thomas' Hospital, and joined the Service in 1886. About a year after joining, Bent left England for a tour of service

in India, and in 1888 saw active service with the Hazara Expedition, for which he received the Frontier medal and clasp. While in the Punjab he also did some excellent work, more arduous and exacting if less exciting than active service, during a cholera epidemic at Ferozepore. This earned for him special thanks, which were officially recorded.

After a tour at home he was stationed in the West Indies, and while at Barbadoes volunteered for, and took part in the relief expedition which was sent in 1902 to Martinique, after the devastating eruption of Mont Pelee which caused the loss of some 30,000 lives and an immense amount of suffering. For his good work on this occasion he was thanked by the Governor of Barbadoes and by the Commander-in-Chief, Lord Roberts.

During his five or six years in the West Indies an epidemic of yellow fever added to his other experiences.

After another spell at home, Bent went again out to India, and while serving there retired in 1906.

Always of active habits and keen on many games and sports, his generous nature and unfailing cheeriness made him popular with officers and men with whom he came in contact, in all branches of the Army; and it was a surprise and regret to his many friends when he decided to give up the active life of the Service.

An officer who knew George Bent well writes: "These two years were very bad, we started in 1892 with cholera and finished up with malaria. Bent worked all through this, and his courage, energy and zeal, were much appreciated by all ranks of the battalion, then under my command. We started down country with the men full of fever. I had to bury one the first day out, and then we commenced to drop them *en route*. It was very depressing, but Bent did his work unassumingly and without fuss or worry, and personally he was a great help to me in a very trying time."

Bent married in 1908 and leaves a widow to mourn his loss.

TYRRELL.

By the death of Major A. F. Tyrrell the Corps has lost one of its best officers. Born in 1865, the son of the late Henry Tyrrell of 11, Westbourne Gardens, W., he was educated at Hove Lodge School, Brighton, and Highgate School. He received his professional education at the Middlesex Hospital, and passed into the Army Medical Service in 1892.

His war services include the operations on the North-West Frontier of India 1897-8, Malakand, for which he received the medal and clasp, and the South African War, in which he served from 1900 until its close in 1902, at first with the Mounted Infantry, and subsequently as Orderly Officer to the Principal Medical Officer of the Force. He was present at the operations in the Transvaal from November 30, 1900, to May 31, 1902, was twice mentioned in despatches, received a Brevet majority, the Queen's medal with four clasps, and the King's medal with two clasps.

Wherever Arthur Tyrrell served he gathered troops of friends, his frank, open, sunny nature endearing him to all with whom he came in contact. Fond of his work, and devoted to his Corps, his quiet unostentatious influence always made itself felt, a silent example for those around him. His wide sympathies and single-mindedness appealed to junior and senior alike, and his early death deprives a large circle of friends of one whom they can ill spare.

The last years of his life were spent patiently and courageously struggling against illness, the result of active service. He never completely recovered from the severe attack of dysentery, for which he was invalided from the Malakand, and from which he also suffered on and off during the Boer War, although he always bravely remained at his duty. An operation, recently successfully performed, promised to restore him to health, but after return from Osborne, when seemingly on the high road to complete recovery, perforation suddenly and unexpectedly took place, and, despite prompt removal to Millbank and a further operation, he died of peritonitis on March 22, 1911.

He was buried in Highgate Cemetery on March 25, after a funeral service in the Chapel at The Queen Alexandra Military Hospital, which was attended by his relatives and a large number of his brother officers and friends. Present at the funeral service were his brother, Lieutenant-Colonel C. R. Tyrrell, R.A.M.C.; Surgeon-General Sir Alfred Keogh, K.C.B., late Director-General, Army Medical Service; Surgeon-General Sir Lionel Spencer, K.C.B.; Colonel Erskine Risk; Lieutenant-Colonels C. H. Burtchaell, A. P. Blenkinsop, N. C. Ferguson, G. Cree, and M. W. Russell; Major Herbert

Bray, and many others. Surgeon General W. L. Gubbins, C.B., M.V.O., K.H.S., Director-General, Army Medical Service, who was unavoidably prevented from attending, was represented by Lieutenant-Colonel Burtchaell, Assistant Director-General.

WARRANT OFFICERS AND SERJEANTS' (PAST AND PRESENT) ANNUAL DINNER CLUB.

A General Meeting of the above Club will be held in the Serjeants' Mess, Royal Army Medical Corps, Grosvenor Road, London, S.W., on Saturday, May 13, at 3 p.m.

BUSINESS.

To audit the accounts of the past year, ended April 19, 1911.

To elect officers for the ensuing year.

It is hoped that a representative number of members will make it convenient to attend.

BIRTH.

HYDE.—On April 14, 1911, at 89, Lower Baggot Street, Dublin, the wife of Captain Dermot Hyde, R.A.M.C., of a son.

MARRIAGE.

ELLIOTT—BYRNE.—At Garrison Church, Colaba, by the Rev. Father Lloyd-Thomas, Captain Alfred Charles Elliott, R.A.M.C., to Josephine, eldest daughter of J. P. Byrne, Esq., M.D., Ythanbank, Sask., N.W.T. Canada, late of Wicklow.

DEATHS.

HOWELL.—On March 21, at 68, Denbigh Street, S.W., Geoffrey George, the youngest son of Major H. A. L. Howell, R.A.M.C.

HECTOR.—At Oxford, on March 23, 1911, Honorary Brigade-Surgeon James Hector, M.B., late Army Medical Department, aged 69. He entered the Service as Assistant Surgeon (Staff) on September 30, 1864, and served in the 31st and 54th Foot and Army Medical Department; he became Surgeon March 1, 1873; Surgeon-Major September 30, 1876; Surgeon-Lieutenant-Colonel September 30, 1884, and retired with the honorary rank of Brigade-Surgeon on February 26, 1887. His war service was: South African War, 1879. Zulu Campaign, with a flying column. Sekukuni Campaign, with the Transvaal Field Force at attack and capture of Sekukuni's stronghold. Despatches, *London Gazette*, January 16, 1880. Medal with clasp.

MARSTON.—At 56, Nevern Square, South Kensington, on March 31, 1911, Surgeon-General Jeffery Allen Marston, C.B., M.D., F.R.C.S., K.H.S., retired, Army Medical Staff, aged 79. He entered the service as an Assistant Surgeon on November 10, 1854, served with the Royal Artillery and on the Staff; became Surgeon June 8, 1867; Surgeon-Major, Army Medical Department, March 1, 1873; Brigade-Surgeon November 27, 1879; Deputy-Surgeon-General November 18, 1882; Surgeon-General May 7, 1889, and retired on October 16, 1889. He was appointed Honorary Surgeon to the Viceroy of India in 1882; a Companion of the Bath in 1887; and Honorary Surgeon to the Queen in 1889. In 1882 he was granted the 3rd class of the Imperial Ottoman Order of the Osmanieh. He served in the office at Headquarters from 1867 to 1877. During this period he rendered especially valuable services. In 1884 he was appointed by the Lord Lieutenant of Ireland to serve on a commission to enquire into and report upon certain matters affecting the well-being and efficiency of the Queen's Colleges in Ireland. During the illness of Professor de Chaumont, Deputy Surgeon-General Marston delivered a course of lectures on Hygiene at the Army Medical School, Netley (summer session, 1887), and in the same year he represented Her Majesty's Government at the International Medical Congress held at Washington, United States of America. On his return from America he furnished a full report of

the Congress, which was considered of so great interest that it was officially printed and published. From December, 1882, to 1888, he was a member of the Army Sanitary Committee, and was reappointed a member as a retired officer in July, 1890. His war service was: Egyptian Expedition, 1882—Sanitary Officer, Battle of Tel-el-Kebir. Despatches, *London Gazette*, November 2, 1882. Medal with clasp, bronze star, Pro. Deputy-Surgeon-General, 3rd Class Osmanieh.

MEANE.—In London, on December 10, 1910, Honorary Deputy-Surgeon General John Meane, half-pay, late Army Medical Department, aged 83. He entered the Service as acting Assistant Surgeon, on November 5, 1852, and served in the 20th, 31st, 46th, 72nd and 78th Foot and Army Medical Department. He became Assistant Surgeon, December 24, 1852; Surgeon, September 21, 1860; Surgeon-Major, November 5, 1872; Brigade-Surgeon, March 26, 1880; and retired on half-pay with the honorary rank of Deputy Surgeon-General, on March 23. 1881. His war service was: Crimean Campaign, 1855; siege and fall of Sevastopol (wounded), attacks on Redan of June and September 8. Mentioned in Despatches. Medal with clasp; Turkish medal. Afghan War, 1878-1880. Mentioned in Despatches. Medal.

POWELL.—At Rangoon, on March 23, 1911, of pneumonia, Lieutenant-Colonel Simpson Powell, M.D., R.A.M.C., aged 52. He entered the Service as Surgeon Medical Staff, on May 30, 1885. (Parkes Memorial Bronze Medal in Hygiene and 2nd Montefiore prize for military surgery). Became Surgeon-Major, Army Medical Staff, on May 30, 1897, and Lieutenant-Colonel, Royal Army Medical Corps, on May 30, 1905.

RENTON.—On January 23, 1911, Honorary Brigade-Surgeon David Renton, M.D., late Army Medical Staff, aged 71. He entered the Service as Assistant-Surgeon (Staff), on September 30, 1864; served also in 15th Hussars; became Surgeon, Army Medical Department, March 1, 1873; Surgeon-Major, September 30, 1876; Surgeon Lieutenant-Colonel, September 30, 1884; and retired on retired pay with the honorary rank of Brigade-Surgeon on November 26, 1884. His war service was: South African War, 1879; Zulu Campaign Medal.

ROBINSON.—At Ealing on April 1, 1911, Honorary Brigade-Surgeon Albert Benjamin Robinson, retired, late Army Medical Department, aged 70. He entered the Service as an Assistant Surgeon (Staff), September 30, 1864, served in the 3rd Dragoon Guards and 15th Hussars; became Surgeon, Army Medical Department, March 1, 1873; Surgeon-Major, September 30, 1876; Surgeon Lieutenant-Colonel, September 30, 1884, and retired on retired pay with the Honorary rank of Brigade-Surgeon, April 11, 1885.

TYRRELL.—At the Queen Alexandra Military Hospital, London, on March 22, 1911, Major Arthur Frederick Tyrrell, R.A.M.C., aged 45. He entered the Service as Surgeon-Lieutenant, Army Medical Staff, on July 27, 1892; became Surgeon-Captain, July 27, 1895; Brevet Major, Royal Army Medical Corps (for service in South Africa), August 22, 1902; and Major, October 25, 1904. His war service was: Operations on North-west Frontier of India, 1897-8. Malakand Medal with clasp. South African War, 1900-02. Orderly Officer to Principal Medical Officer, South Africa. Operations in the Transvaal, November 30, 1900, to May 31, 1902. Despatches, *London Gazette*, April 16, 1901 and July 29, 1902. Brevet of Major. Queen's medal with four clasps. King's medal with two clasps.

EXCHANGES, &c.

The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, Serle Street, London, W.C., not later than the 22nd of the month.

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MANAGER'S NOTICES.

The JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January, but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in March and September of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters regarding non-delivery of the Journal, or change of address, should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and reach there not later than the 20th of each month.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

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THE HON. MANAGER,
"JOURNAL OF THE ROYAL ARMY MEDICAL CORPS,"
WAR OFFICE, WHITEHALL, S W.

Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notified at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Lieutenant-Colonel C. C. Reilly, Major A. O. B. Wroughton, E. H. Ross, Esq., Colonel Sir David Bruce, Major H. W. K. Read, Captain P. S. Lelean, Lieutenant-Colonel C. H. Melville, Captain J. A. Balck, Major C. G. Spencer, Lieutenant H. Stott, I.M.S., Major F. J. W. Porter, D.S.O., Major G. S. McLoughlin, Lieutenant-Colonel S. Westcott, Major J. Cowan, Major H. W. Grattan, Major D. Harvey, Major J. G. McNaught, Captain S. R. Godkin, Major C. T. Samman, Captain S. R. Godkin, I.M.S., Surgeon Major-General A. F. Bradshaw (R), Captain P. Davidson, Captain N. D. Walker, Lieutenant Colonel A. R. Aldridge.

The following publications have been received:—

British: The Malaya Medical Journal, The Australasian Medical Gazette, Study of Malaria in India, Paludism, The Lancet, Annals of Tropical Medicine and Parasitology, Medical Press and Circular, Army and Navy Gazette, The Royal Engineers Journal, The Hospital, The Journal of Meat and Milk Hygiene, The Practitioner, Journal of the Royal Sanitary Institute, The Shield, Guy's Hospital Gazette, Red Cross and Ambulance News, The Medical Review, Public Health, The Journal of Tropical Medicine and Hygiene, Nitrification and the Absorption Theory, The Indian Medical Journal, The Army Service Corps Quarterly, Journal Sleeping Sickness Bureau, The British Journal of Tuberculosis.

Foreign: Deutsche Militärärztliche Zeitschrift, Russian Naval Medical Journal, United States Department of Agriculture, Revista de Sanidad Militar, Resumen de la Estadistica Sanitaria del Ejercito Espanol, Archives de Médecine Navale, The Military Surgeon, Giornale di Medicinæ Militare, Tidsskrift i Militar Hälsovard, Norsk Tidsskrift for Militaermedicin, Archiv für Schiffs-und Tropen-Hygiene, Annali di Medicina Navale e Coloniale, Archives de Médecine et de Pharmacie Militaires, Bulletin of the Johns Hopkins Hospital, Gazette Médical de Paris, Le Caducée.

JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS.

Corps News.

JUNE, 1911.

ARMY MEDICAL SERVICE.

Colonel Henry W. Murray, M.B., is placed on retired pay, dated May 12, 1911. Colonel Murray entered the Service as a Surgeon, Army Medical Department, on July 31, 1880; became Surgeon-Major, Army Medical Staff, July 31, 1892; Lieutenant-Colonel, Royal Army Medical Corps, July 31, 1900, Lieutenant-Colonel with increased pay, September 9, 1903, and Colonel, March 9, 1908. His War Service is: South African War, 1899-1902. Advance on Kimberley, including action at Magersfontein. Operations in the Orange Free State, February to May, 1900, including operations at Paardeberg, February 17 to 26; actions at Poplar Grove and Driefontein. Operations in Orange River Colony, May to November 29, 1900, including actions at Wittebergen, July 1 to 29, and Witpoort. Operations in Orange River Colony, November 30, 1900 to January, 1902. Queen's medal with four clasps. King's medal with two clasps.

Lieutenant-Colonel Francis J. Jencken, M.B., from the Royal Army Medical Corps to be Colonel *vice* H. W. Murray, M.B., dated May 12, 1911.

ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonel James H. A. Rhodes retires on retired pay, dated April 19, 1911. Lieutenant-Colonel Rhodes entered the Service as a Surgeon, Army Medical Department, on February 5, 1881; became Surgeon-Major, Army Medical Staff on February 5, 1893; Lieutenant-Colonel, Royal Army Medical Corps, on February 5, 1901, and Lieutenant-Colonel with increased pay, September 18, 1905.

Lieutenant Stuart McK. Saunders is seconded for service with the Egyptian Army, dated March 26, 1911.

Major Walter C. Poole, M.B., retires on retired pay, dated May 3, 1911. Major Poole entered the Service as a Surgeon, Medical Staff, on February 5, 1887 and became Major, Royal Army Medical Corps on February 5, 1899. His War Service is: Operations on North-West Frontier of India, 1897-1898, with Malakand Field Force. Medal with clasp. South African War, 1899-1902. Operations in the Orange Free State, May, 1900. Operations in Orange River Colony, May to November 29, 1900. Operations in Cape Colony, November, 1899, to May, 1900. Operations in the Transvaal, April to May, 1902. Operations in Orange River Colony, November 30, 1900, to April,

1902, and May, 1902. Queen's medal with three clasps. King's medal with two clasps.

Captain Charles Joseph Coppinger, M.B., from the Indian Medical Service, to be Captain, *vice* William S. Mealor, who exchanges, dated March 31, 1911.

Lieutenant Walter H. S. Burney, from the seconded list, is restored to the establishment, dated April 1, 1911.

MEMORANDUM.

Colonel Richard Jennings, M.D., Army Medical Service, to be an Honorary Surgeon to the King, *vice* Surgeon-General J. A. Marston, C.B., M.D., deceased, dated April 1, 1911.

HIGHER RATE OF PAY.—Lieutenant-Colonels S. Hickson and H. J. Fletcher have been selected for the higher rate of pay under Article 317, Royal Warrant.

ARRIVALS HOME FOR DUTY.—From India: On April 20, Colonel T. J. O'Donnell, D.S.O., Captains C. G. Thomson, R. H. L. Cordner and C. J. Coppinger. From Gibraltar: On April 22, Lieutenant-Colonel C. E. Faunce. From Mauritius: On May 13, Quartermaster and Honorary Lieutenant T. E McColgin.

POSTINGS.—To the Southern Command: Colonel T. J. O'Donnell, D.S.O., Captain R. H. L. Cordner. To the Eastern Command: Lieutenant-Colonel C. E. Faunce, Lieutenant J. S. Levack. To Aldershot: Captain C. J. Coppinger.

APPOINTMENTS.—Colonel H. H. Johnston, C.B., Principal Medical Officer, Gibraltar. Colonel Douglas Wardrop, C.V.O., retired pay, has been appointed House Governor and Medical Superintendent of the Convalescent Home for Officers at Osborne, as from April 1, 1910, *vice* Lieutenant-Colonel C. R. Kilkelly, C.M.G., M.V.O.

ARRIVALS HOME ON LEAVE.—Majors H. P. Johnson, S. W. Sweetnam, E. B. Steel, W. P. Gwynne, S. de C. O'Grady, D. Harvey, L. E. L. Parker, G. M. Goldsmith, Captains W. B. Fry, E. W. Powell, F. D. G. Howell, C. Scaife, F. L. Brandish, J. du P. Langrishe.

EMBARKATIONS.

For West Africa.—On April 26, Captain G. R. Painton.

For Gibraltar.—On May 5, Colonel H. H. Johnston, C.B., Lieutenant F. H. Somers-Gardner.

For Egypt.—On May 11 (for service with the Egyptian Army), Lieutenant E. M. Parsons Smith.

ROSTER FOR SERVICE ABROAD.—An Exchange has been approved between Majors F. J. W. Porter and C. B. Martin.

QUALIFICATIONS.—Captain J. F. Martin has obtained the Diploma in Public Health of the Royal College of Physicians, England; Captain F. M. Parry that of the University of Cambridge, and Lieutenant A. D. Stirling that of St. Andrews University; Lieutenant A. P. O'Connor has qualified as a 2nd Class Interpreter in German; Colonel Sir D. Bruce, C.B., F.R.S., has been elected to the Fellowship of the Royal College of Physicians of London; Major M. P. C. Holt, D.S.O., has been appointed Honorary Surgeon to His Excellency the Viceroy of India.

Major G. S. Crawford has received the Silver Medal and Diploma of the Italian Red Cross Society, in recognition of services rendered in connection with the recent earthquake in Italy.

RESULTS OF EXAMINATIONS.

The following results of examinations are notified for general information:—

Passed for promotion to the rank of Captain in (b): S. S. Dykes, M.B., E. V. Vaughan, M.B.

NOTES FROM THE LONDON DISTRICT.—On Sunday, April 23, an interesting and memorable function took place at the Queen Alexandra Military Hospital Chapel, when Major-General A. E. Codrington, C.V.O., C.B., General Officer Commanding

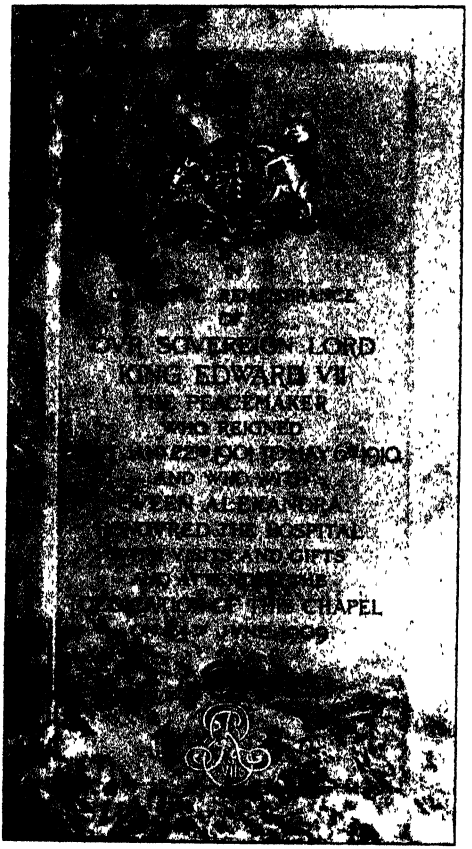
London District, unveiled the Memorial Tablet to King Edward VII., presented to the Chapel by a loyal and devoted subject of His Majesty.

In the middle of the Sunday morning service, the General Officer Commanding advanced and said, "To the Glory of God, and in loving Memory of King Edward VII., I unveil this Tablet in the name of the Father, Son, and Holy Ghost."

The Commandant, Colonel Risk, read the lesson.

The Chaplain-General to the Forces, the Right Reverend Bishop J. Taylor Smith, C.V.O., offered up prayer and preached a dedicatory sermon, which was highly appreciated by the congregation.

Several distinguished officers were present, and representatives of various branches of the Service, both on the Active and Retired Lists. All the former were dressed in Review Order, and the Staff in blue.



NOTES FROM ALDERSHOT.—Serjeant-Major Roberts writes: "As foreshadowed in my previous notes, a very large number of members from here attended the Annual Dinner of the Warrant Officers, Staff-Serjeants, and Serjeants, held at the Pillar Hall, Victoria Station, London, on April 19 last. Including officers, the contingent numbered 54. Their welfare was attended to by a Committee consisting of S-M. Roberts, Q.-M.-S. Connelly, and S.-S. Merchant. A saloon was provided for the journey to and from

London, which was much appreciated, especially during the return journey, when the members were entertained with suitable music by a portion of our band.

Annual Dances.

"The Corporals serving here gave their Annual Dance on April 22, in the Army Service Corps Theatre. The function was a great success, as this event always is. The committee, consisting of Corporals Morfitt, Bull, Fry and Cooper, are to be congratulated.

"Invitations for this social gathering are eagerly sought after, with the result that the attendance was very large. The programme comprised twenty-four dances, which carried the happy throng merrily along till the small hours of the morn.

"The Serjeants' Annual Dance took place on April 28, in the prettily appointed Army Service Corps Theatre, a structure that lends itself to a function of this nature, being well equipped with side offices for use as supper rooms, bar, lounges, &c. Although the invitations were limited, about 800 were present.

"The dance programme was:—

Part I.

1.	*Waltz*	"Songe d'Automne."
2.	*Esperano Barn Dance*	"Weymouth Chimes."
3.	*Quadrilles*	"Jollification."
4.	*Two-Step*	"Rings on my Fingers."
5.	*Waltz*	"Choristers."
6.	*Lancers*	"Mikado."
7.	*La Nouveauté*	"Rose Mouseuse."
8.	*Pas Styrians*	"Original."
9.	*D'Alberts*	"Angelo Mio."
10.	*Schottische*	"The Red Cross."
11.	*Boston Two-Step*	"Original."
12.	*Waltz Imperial*	"Original."

Part II.

1.	*Lancers Grand March*	"Quaker Girl."
2.	*Brooklyn Schottische*	"Swannee River."
3.	*Waltz*	"Columbine."
4.	*Quadrilles*	"After Supper."
5.	*Two-Step*	"Mickey's Birthday."
6.	*La Nouveauté*	"Original."
7.	*D'Alberts*	"Traumideale."
8.	*Waltz*	"Septembre."
9.	*Boston Two-Step*	"Original."
10.	*Lancers*	"Earl and the Girl."
11.	*Veleta*	"Thousand Kisses." "Inferno."
12.	*Waltz and Gallop*	"Scarborough."

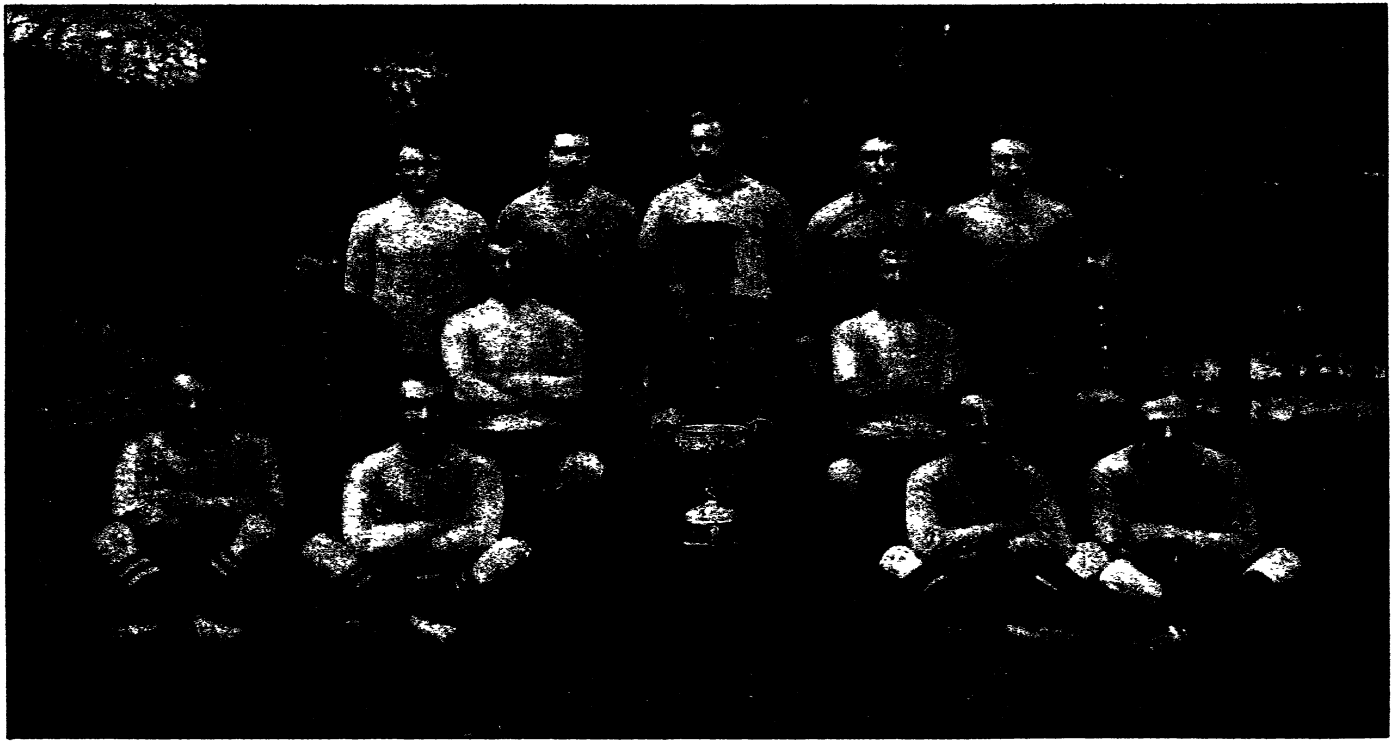
'God Save the King.'

"The Corps Band added greatly to the delight of all, by the skill its members displayed in rendering the musical items, causing such abundant vitality to the dancers that they were really sorry when each dance finished. The catering was so satisfactorily carried out by Messrs. Darracott, of Aldershot, that the firm is likely to receive our patronage for similar functions.

"The committee, composed of Quartermaster-Serjeant Cox, Staff-Serjeant Steele, Serjeants Muirhead, Langston, Avery, Stokes and Pickup, are to be congratulated on the success attained.

"Football having temporarily ceased to reign, our efforts are now directed to the summer game of cricket. The season is being confidently looked forward to here by all units of the Corps, the introduction of a 'Company Cricket League' giving the necessary impetus to the game. Great keenness is being manifested in the tourney, and doubtless will reveal some young players of promise. Excellent fixtures for the

WINNING TEAM.



Front row—Corporal Holloway, Serjeant Stokes, Private Duggan, Staff-Serjeant Steele.
Centre row—Serjeant-Major Figg, Private Hills, Lieutenant-Colonel Treherne, Private Pearson, Serjeant-Major Bellen.
Back row—Private Berry, Lance-Corporal Hazell, Private Burdwell, Private Burgent, Private Harwell.

corps 1st and 2nd Teams have been arranged by the respective Honorary Secretaries, Serjeant-Major Tod and Serjeant-Major Roberts. Our 'Serjeants' Mess' has never been so rich in players as now, so the 'Old 'uns' will be able to battle with other Messes, and many excellent fixtures have been provided.

The Corps Athletic Sports will take place on July 11 and 12, when any visitor will be welcomed, especially if he can win a few prizes.

At the recent Royal Engineers' Annual Sports, a team composed of Privates Prince, Hazel, Jepp, and Elsey won the Relay Race, open to the Aldershot Command. 1st 220, Private Jepp held his own, just beaten for first place on the tape—2nd 220, Private Hazel, remained second, neither gaining or losing—440 yards, Private Prince held second place, but lost on the first man—880 yards; Private Elsey ran a good race, 15 yards to pick up, and then won by 4 yards.

"Congratulations to No. 1 Company on winning the Inter-Company Royal Army Medical Corps Football League for 1910-11. Their success was well deserved."

I append the league table:—

Team	Played	Won	Lost	Drawn	Goals For	Goals Agst.	Points
No. 1 Company ..	10	8	1	1	39	10	17
"A" Company ..	10	7	2	1	26	15	15
No. 2 Company ..	10	7	3	—	41	11	14
"C" Company ..	10	—	6	4	13	28	4
No. 3 Company ..	10	1	7	2	11	28	4
"B" Company ..	10	—	8	2	9	47	2

NOTES FROM COLCHESTER.—Serjeant-Major Folkes writes: "The following cutting from the *Essex County Standard* may interest the readers of CORPS NEWS.

"R.A.M.C. PRESENTATION.

"On Friday evening, April 28, Serjeant-Major Rees, who is retiring from the Army after 26 years' service, was the recipient of two handsome presentations from members of the 9th Company Royal Army Medical Corps, on the occasion of a smoking concert held in the Serjeants' Mess of the Company at Colchester.

"The first presentation was made by Corporal Glasson on behalf of the junior non-commissioned officers and men of No. 9 Company, and took the form of a beautiful chiming clock. The second gift, presented by Serjeant-Major Ward, who is succeeding Serjeant-Major Rees at the Colchester Garrison Hospital, took the form of a handsome canteen, consisting of 52 pieces of plate, each inscribed with the initials of Serjeant-Major Rees.

"Mr. Rees, in returning thanks for the gifts, declared that No. 9 Company was absolutely the best he had ever soldiered in.

"Mr. Simms, on behalf of the honorary members of the Mess, spoke of the unvarying kindness and courtesy they had experienced from Mr. Rees, and Quarter-Master-Serjeant Chisholm, A.P.C., and Barrack-Warden Bowd re-echoed these remarks.

"During the evening songs, &c., were given by Serjeant-Major Rees, Serjeant-Major Ward, Staff-Serjeant Mantle, D.L.I., Quarter-Master-Serjeant Cassall, R.A.M.C., Quarter-Master-Serjeant Oliver, A.S.C., Mr. Simms and others."

NOTES FROM THE CURRAGH.—Captain J. A. Balok writes: "We have just had a most exciting contest here for the Inter-Regimental Golf Cup (Handicap). In the first round we met the Army Service Corps and beat them. Our team consisted of Captain H. A. Davidson (16), Captain Wetherell (14), Captain Falkner (7), and Lieutenant Robb (9).

"We next had to play the Kildare Royal Field Artillery, and very formidable opponents they were. Two of their team were 'plus' men, and the handicap of the other two was only 4. Our team, too, in the interval, had got rather disorganised. Davidson had gone on leave, Robb had gone to Kilbride Camp. However, the situation was saved by Lieutenant Winder nobly going out to relieve Robb for a few days, and by Lieutenant Cunningham (7) giving up a few days of his leave to come and play. The features of the morning's play were Robb's victory over his opponent by 6 and 4, and Falkner beating his opponent, the amateur ex-Champion of Ireland, but the result of the Singles as a whole left the gunners a quarter of a point up. Everything, therefore,

depended on the foursomes. Falkner and Cunningham had their match well in hand from the start, were, in fact, 6 up on the 11th green. Then they lost 4 holes in succession, but winning the 16th won their match 3 and 2, and halved the bye. In the meantime the other match was going all the other way. When our men went on to the 13th tee they were 4 down and with only 6 to play, and things looked very serious. But the unexpected happened. We won the 13th, we halved the 14th, we won the 15th, 16th, 17th, and started the 18th all square. There is a notable hazard there locally known as the 'quarry,' which has buried many a good ball. Our opponents drove straight into it, and Wetherell, who never plays better than with his back to the wall, easily cleared the bunker. We won the hole, and the match.

"Our success brought us into the Finals, where we met the 2nd Connaught Rangers. The conditions of the previous match were reversed, for while there we received strokes, here we had to give them. Our team was the same, Winder gallantly relieving Robb once more, and Falkner specially coming back from leave in England. Here again the chief interest centred on the afternoon, the morning's play leaving us all square. It proved a very close thing. Falkner and Cunningham made heavy weather from the outset. No less than three times they had to pick up, their balls having got into various unplayable positions. Still at the 15th hole they were all square. But misfortune still dogged them. While our opponents put their third shot on the green, ours landed in a bunker. However, there was nothing for it but to play for it. Falkner took his niblick, played hard and true, and not only got the ball out in one, but on to the green within a yard or so of the hole. Cunningham with equal success managed the somewhat tricky downhill putt, and we halved the hole and won the next two and the match.

"Meanwhile the other team were having it by no means all their own way. At the 15th it was all square. Then, however, came a splendid finish, the last three holes being all done in one under Bogey. We won the match on the 17th green, and a magnificent putt of Wetherell's on the 18th green gave us the bye also. Robb's play the whole day was at the top of his form.

"Cricket has now begun and white flannel become a most fashionable costume. Captain Wetherell has been elected President of our Cricket Club, Captain Turner Vice-President, and Lieutenant Cunningham Secretary. We started the season by a match of officers *v.* men, more or less to see what everybody was made of. Of the officers, Turner, Cunningham, and Wetherell kept up their reputation, and of the men, Egan's batting was most promising, and the Bugler's bowling hard to beat."

NOTES FROM GIBRALTAR.—Lieutenant-Colonel Allen writes: "Gibraltar has again been besieged! We have lately sustained a fierce bombardment at the hands of certain great and allied powers, but history has so far repeated itself, and this fortress still remains under the British flag.

"In plain English, we have just been through our annual period of mobilisation, which has been more strenuous than usual this year, and marks the termination of the winter season here, both as regards work and amusements.

"We have, unfortunately, no particular triumphs to record in the football field during the past winter, but we have started the cricket season well with a victory over the Army Ordnance Corps by 37 runs.

"Our innings closed with a total of 92, to which Captain Graham contributed 18, Corporal Court 21 (not out), and Corporal Emery 16. Our score was a moderate one, and the easy defeat of our opponents was largely due to the effective bowling of Corporals Court and Emery.

"At the Spring Meeting of the Gibraltar Jockey Club held on May 10 and 13 Captain Weston's ch. h. 'Chandon' won on both days: Major Marriott's English ch. m. 'Miss Gibbs,' ran second in the 2nd Class Handicap on the 13th.

"There have been several changes among the officers, Royal Army Medical Corps, lately.

"Colonel Murray, who has been here for three years as Principal Medical Officer, and Officer Commanding, Royal Army Medical Corps, retired for age on May 12, and has been succeeded by Colonel H. H. Johnston, C.B., who arrived by Mail Steamer on the 9th inst.

"Colonel and Mrs. Murray's departure is much regretted, not only in the ranks of the Royal Army Medical Corps, but throughout the garrison generally. They both took

a prominent part in all social functions, and Colonel Murray was one of the handicappers of the Jockey Club, President of the Garrison Cricket Club, &c.

"Lieutenant-Colonel C. E. Faunce has also left us on selection for the appointment of Administrative Medical Officer, Chatham. He was also very popular here, and all the officers who could get away assembled on the quay to bid him and Mrs. and Miss Faunce farewell when they embarked.

"Both of these officers were entertained at a farewell dinner at the Mediterranean Club. Lieutenant-Colonel S. G. Allen in proposing the health of the guests, gave expression to the general feeling of regret experienced at their departure.

"Lieutenant Somers-Gardner arrived here on May 9 to complete establishment.

NOTES FROM CAIRO.—Lieutenant-Colonel W. J. Baker, R.A.M.C., retired, writes: "I would like to record a most kindly act, and one which I most deeply appreciated, as showing the feeling existing between the members of No. 33 Company, and their then Commanding Officer, but of which mention was modestly omitted by the writer of the notes which appeared in last month's Journal, and that is, that a short time before my departure from Cairo I was presented by the Company with a beautiful photographic enlargement of a group—taken for the purpose—of all the Officers, N.C.O.'s and men present at headquarters. The photograph, which is a most excellent work of art, is some 3 feet long, by 2½ feet high, and is mounted in a massive and superbly carved Egyptian-Mushabea-work frame, inlaid with mother-of-pearl, the top portion of the frame being further ornamented with a fine carved scroll, similarly inlaid; the whole standing on a beautifully carved and polished easel some 8 feet high, also inlaid, and bearing on the front the following inscription on a brass plate: 'Presented to Lieutenant-Colonel W. J. Baker, R.A.M.C., by the Officers, N.C.O.'s and men, of No. 33 Company, Royal Army Medical Corps, Cairo, December, 1910.'"

NOTES FROM HARRISMITH, O.F.S.—Serjeant-Major Taylor writes: "The cricket season here has just closed, and the following short account may interest old members of the detachment.

"As we had to meet Mounted Infantry Companies nearly 150 strong, a Battery of Artillery at full strength, and the Army Service Corps Company of about 70, whilst our detachment only averages 24, the record is quite creditable.

"Matches played 22. Won 13. Lost 9.

"Our best batting averages were: Corporal Mayo 21, Corporal Mayman 16, Private Boxall 13, Lieutenant Parkinson and Private Lovett 11, Private Winkworth 8, Serjeant Gamblin and Private Hall 7.

"The best bowling averages were Private Winkworth 6 wickets for 36 runs, Corporal Mayman 80 wickets for 486 runs, Corporal Mayo 51 wickets for 368 runs, Private Boxall 23 wickets for 209 runs, Private Lovett 48 wickets for 505 runs, and Private Hall 56 wickets for 641 runs.

"In the Inter-Company Cup Competition we were drawn against the 19th Company Army Service Corps, and won by 5 wickets and 15 runs, but in the second and semi-final round we were beaten by 46 runs by the 2nd Hants Company, although we had twice beaten them in friendly matches previously.

"The detachment is now busy clearing the ground for the football season. Of last year's football team we have lost Corporal Leppington, who has gone to Bloemfontein for study in Part B, Dispensing, Privates Dunn and Hird to the same station for training in the Nursing Section, and Privates Boxall and Toomey to England; but in a draft from home we have gained Corporal Mayo, Privates Rouse and Green, and Serjeant Gamblen and Private Fuller from Bloemfontein, and hope we have not lost by the exchange."

NOTES FROM SIMLA.—Brevet-Colonel R. S. F. Henderson, K.H.P., R.A.M.C., Secretary to the Principal Medical Officer, His Majesty's Forces in India, writes as follows, dated April 20, 1911:

"*Appointments.*—Major W. H. S. Nickerson, V.C. R.A.M.C., has been appointed to officiate as Sanitary Officer, 1st (Peshawar) Division.

"*Leave.*—Colonel F. B. Maclean, British Service, has been granted privilege leave from April 14, 1911, pending retirement, and Brevet-Colonel R. S. F. Henderson, K.H.P., R.A.M.C., privilege leave ex India, from May 15, 1911. The grant of general leave out of India to the undermentioned officers has been concurred in: Lieutenant-Colonel S. C. Philson, R.A.M.C., for three months from July 1, 1911; Major R. J.

Blackham, R.A.M.C., for four and a half months, from May 17, 1911; Captain E. W. Powell, R.A.M.C., for four months, from April 5, 1911; Captain W. Bennett, R.A.M.C., for four months, from June 6, 1911.

"*Postings.*—Captain D. T. McCarthy, R.A.M.C., has been transferred from the 7th (Meerut) to the 8th (Lucknow) Division for duty.

"*Specialists.*—Major H. G. Walton, R.A.M.C., has been appointed specialist in Advanced Operative Surgery, 8th (Lucknow) Division.

"Major C. T. Samman, R.A.M.C., has been appointed specialist in Mental Science, Southern Army."

AWARD OF ROYAL VICTORIAN MEDAL.

It is notified for general information that His Majesty The King has been graciously pleased to award the Royal Victorian Medal (in silver) to No. 11370 Serjeant Frederick Loveland.

PROMOTIONS.

The following promotions, to complete Establishment, will take effect from the dates specified :—

To be Serjeant-Majors.

No.	Rank and Name		Date	Section	Remarks
9006	Qmr.-Serjt.	Smith, G. J. ..	31.1.11	..	*Vice* W. Henfrey, to pension.
10435	,, ,,	Huntingford, A.	18.2.11	..	,, A. F. Tait, to H.M. Commission.
9235	,, ,,	Wickersham, J.	1.3.11	..	,, J. F. Ford, to pension.
10259	,, ,,	Higdon, F. ..	4.3.11	..	,, T. E. McColgin, to H.M. Commission.
10616	,, ,,	Bray, G. T. ..	4.3.11	..	,, C. H. Smith, to H.M. Commission.
9651	,, ,,	Birch, E. ..	2.5.11	..	,, J. M. Rapson, to pension.
9801	,, ,,	Duff, H. ..	5.5.11	..	,, W. E. Hill, to pension.
10566	,, ,,	Dring, B. C. ..	8.5.11	..	,, H. J. Ford, to pension.
9876	,, ,,	Powell, A. G. ..	12.5.11	..	,, A. R. Rees, to pension.

To be Quartermaster-Serjeants.

10086	S.-Serjt. ..	Holding, A. W.	31.1.11	..	*Vice* G. J. Smith, promoted.
11554	,, ..	Spencer, R. ..	18.2.11	..	,, A. Huntingford, promoted.
10711	,, ..	Sharpe, F. W...	1.3.11	..	,, J. Wickersham, promoted.
11685	,, ..	Cox, W. ..	4.3.11	..	,, F. Higdon, promoted.
10932	,, ..	Ward, C. ..	4.3.11	..	,, G. T. Bray, promoted.
10573	,, ..	Chudleigh, W.H.	6.3.11	..	,, A. W. Holding, to pension.

To be Staff-Serjeants.

No.	Rank and Name		Date	Section	Remarks
10086	S.-Serjt. ..	Holding, A. W.	31.1.11	..	From Colonial Government.
12386	,, ..	Purchase, E. ..	1.2.11	..	Reduction cancelled. Authority C.R., S.C., No. 37490 (A. 2), d/28.1.11, *vice* A. Johnson, to pension.
8883	Serjeant ..	Fowler, A. ..	5.2.11	..	*Vice* G. Scott, to pension.
12434	,, ..	Eallett, R. B...	5.2.11	..	,, A. Fowler, Supernumerary with Territorial Forces.
16177	,, ..	Robinson, A. F.	8.2.11	..	,, S. R. Holmes, to Territorial Forces.
16287	,, ..	Saunders, W. E.	11.2.11	..	,, H.G.M.Traynier, to pension.
11779	S.-Serjt. ..	Neenan, G. ..	18.2.11	..	From Colonial Government, *vice* R. Spencer, promoted.
8700	Serjeant ..	Cudmore, F. W.	24.2.11	..	Under para.351,King's Regulations. Supernumerary with Territorial Forces.
8791	,, ..	Jewell, V. E. ..	1.3.11	..	*Vice* F. W. Sharpe, promoted.
16573	,, ..	Nichol, R. S. ..	1.3.11	..	,, V. E. Jewell, Supernumerary with Territorial Forces.
15721	,, ..	Odell, A. E. ..	4.3.11	..	,, W. Cox, promoted.
11020	,, ..	Lavis, W. ..	4.3.11	..	,, C. Ward, promoted.
10916	,, ..	Carpenter, E. V.	6.3.11	..	,, W.H.Chudleigh, promoted
11761	,, ..	Walls, F. S. ..	8.3.11	..	,, R. T. Pack, to pension.
8714	,, ..	Walsh, A. S. ..	18.3.11	..	Underpara.351,King's Regulations. Supernumerary with Territorial Forces.
8763	,, ..	Yeoman, H. ..	10.5.11	..	Special under para. 351 King's Regulations.

To be Serjeants.

No.	Rank and Name	Date	Section	Remarks
8696	Corporal .. Wason, B. W. W.	18.1.11	Nursing ..	*Vice* R. Dunn, discharged.
9708	Lce.-Serjt. Hughes, A. ..	1.2.11	Cooking ..	Special as High-class Cook, *vice* E. Purchase, reduction cancelled
10577	,, .. Todd, J. ..	5.2.11	Nursing ..	*Vice* R. B. Eallett, promoted.
10955	,, .. Rowe, J. H. ..	8.2.11	General Duty	,, A. F. Robinson, promoted.
15648	,, .. Hill, E. J. ..	11.2.11	Nursing ..	,, W. E. Saunders, promoted.
18717	,, .. Hart, C. H. ..	17.2.11	General Duty	,, D. Lochiel, discharged.
18463	,, .. Day, F. W. ..	20.2.11	Nursing ..	,, B. W. W. Wason, to pension.
17485	,, .. Kennedy, H. ..	1 3.11	,, ..	,, C. E. James, to Territorial Forces.
11614	,, .. Howard, H. W.	1.3.11	Q.A.I.M.N.S.	,, R. S. Nichol, promoted.
18032	,, .. Burns, J. I. ..	4.3.11	General Duty	,, A. E. Odell, promoted.
17102	,, .. Harvey, D. ..	4.3.11	Nursing ..	,, W. Lavis, promoted.
18222	,, .. Dady. A. ..	6.3.11	General Duty	,, E. V. Carpenter, promoted.
13555	Corporal .. Allen, W. J. ..	8.3.11	,, ..	,, G. W. Palmer, to pension.
18170	,, .. Sufrin, L. ..	8.3.11	,, ..	,, F. S. Walls, promoted.
12185	,, .. Willis, A. S. ..	25.3.11	Q.A.I.M.N.S.	,, A.W.C. Baldwin, discharged.
14210	,, .. Fulton, J. ..	31.3.11	Nursing ..	,, G Darling, deceased.

To be Corporals.

18048	Lce.-Corpl.	Eagar, R. ..	1.4.11	General Duty	To complete Establishment.
18128	,, ..	Marr, J. T. ..		Nursing ..	
18199	,, ..	Staff, A. H. ..		General Duty	
18200	,, ..	Collings, W.G...		,, ,,	
18215	,, ..	Dewey, W. W...		,, ,,	
18226	,, ..	Bilbee, L. V. ..		,, ,,	
18230	,, ..	Winkley, F. ..		Clerical ..	
19223	,, ..	Stafford, J. H...		General Duty	
19555	,, ..	Martin, P. C. ..		Clerical ..	
874	,, ..	Johnson, F. A...		Nursing ..	
19558	,, ..	Lythgoe, T. J...		Clerical ..	
10464	,, ..	Morgan, A. ..		Q.A.I.M.N.S.	
11437	,, ..	Deasley, J. W.		,,	
15803	,, ..	Stuart, H. B...		Nursing ..	
17711	,, ..	Holland, D. C.		Cooking ..	
17962	,, ..	Low, H. ..		General Duty	
18040	,, ..	Tootill, W. ..		,, ..	
18262	,, ..	Clear, E. W. ..		Nursing ..	
18257	,, ..	Percy, J. ..		General Duty	
18258	,, ..	Tempo, H. ..		Nursing ..	
18259	,, ..	Roden, W. T...		General Duty	
18291	,, ..	Johnston, G. ..		Clerical ..	

APPOINTMENTS.

The following appointments, to complete Establishment, will take effect from the dates specified :—

To be Lance-Serjeants.

No.	Rank and Name	Date	Section	Remarks
10425	Corporal .. Tollafield, A. ..		Cooking ..	Special as Superintending Cook.
14735	,, .. Cox, J. A. C. ..		,, ..	Special as Superintending Cook.
14706	,, .. Cairns, J. ..		General Duty	Special as Musketry Instructor.
11276	,, .. Darker, J. G...		Cooking ..	
11908	,, .. Prior, A. ..	1.4.11	General Duty	
14072	,, .. Benham, R. R.		Nursing ..	
12275	,, .. Querée, P. M...		,, ..	
18218	,, .. Pacey, W. C. ..		,, ..	As Dispensers.
12768	,, .. Kent, T. R. ..		,, ..	
12187	,, .. Brookes, J. A...		,, ..	
14834	,, .. Rose, S. ..		Cooking ..	
14686	,, .. Wilson, W. A.		General Duty	
14761	,, .. Robertson, W.		Cooking ..	

To complete Establishment.

To be Lance-Corporals.

9102*	Private .. Hughes, H. C...	9.3.11	Nursing ..	
2235*	,, .. Walkley, T. ..		General Duty	
14445	,, .. Smith, W. E...		Nursing ..	
14673	,, .. Didron, G. ..		,, ..	
17496	,, .. Browne, C. ..		Cooking ..	
17680	,, .. Lenihan, T. ..		General Duty	
17899	,, .. Dyke, W. E. ..		Nursing ..	
18329	,, .. Davidson, F. G.		,, ..	
18828	,, .. Reading, J. L.		General Duty	
18832	,, .. Heard, G. ..		,, ,,	
18859	,, .. Day, M. ..		Cooking ..	
18855	,, .. Ellison, J. ..		Nursing ..	
18854	,, .. Forge, C. D. ..		,, ..	
18873	,, .. Spiers, W. J. ..		,, ..	
18860	,, .. Worthington, J.		General Duty	
18898	,, .. Green, G. H. ..		Nursing ..	
18903	,, .. Male, A. ..		General Duty	
19965	,, .. Reilly, J. ..		Superintending Cook	To complete Establishment.
18908	,, .. Dart, W. H. ..	1.4.11	Cooking ..	
18921	,, .. Doling, W. H.		Superintending Cook	
18929	,, .. Taylor, J. W...		Cooking ..	
19868	,, .. Hazell, J. ..		Nursing ..	
18958	,, .. Cousins, S. J...		,, ..	
19626	,, .. White, E. F. ..		1st Class Clerk	
18964	,, .. Herbert, G. W.		Nursing ..	
18966	,, .. Whitney, A. E.		Q.A.I.M.N.S.	
18979	,, .. Bushnell, S. R.		Nursing ..	
18984	,, .. Breeze, B. ..		,, ..	
408	,, .. Kniep, O. ..		1st Class Clerk	
19010	,, .. Bull, B. J. ..		General Duty	
19023	,, .. Tarbet, A. ..		Nursing ..	
19031	,, .. Leahy, J. ..		,, ..	
19032	,, .. Cooke, J. ..		,, ..	
19030	,, .. Mann, R. S. ..		,, ..	
19037	,, .. Thomas, W. B.		1st Class Clerk	

Special under para. 281, Standing Orders, R.A.M.C.

NURSING SECTION.

The following appointments to the Nursing Section of the Corps will take effect from the dates specified:—

No.	Rank and Name		Date	No.	Rank and Name		Date
19592	Pte. ..	Ranger, H. P...	7.1.11	1520	Pte. ..	Spalding, A. J.	28.1.11
4666	,, ..	Pearce, D. ..	7.1.11	4940	,, ..	Holway, A. L...	28.1.11
4564	,, ..	Bowern, J. W.	10.1.11	4951	,, ..	Flack, C. ..	28.1.11
4784	,, ..	O'Brien, W. ..	10.1.11	4974	,, ..	Frost, R. F. M.	28.1.11
4894	,, ..	Crossman, W. G.	11.1.11	5023	,, ..	Grist, R. ..	28.1.11
4976	,, ..	Hall, W. W. C.	11.1.11	1342	,, ..	Davis, H. ..	6.2.11
943	,, ..	Ball, A. H. ..	14.1.11	19276	,, ..	Young, J. J. ..	7.2.11
4593	,, ..	Martin, P. G. ..	14.1.11	4494	,, ..	Morris, A. L. ..	7.2.11
4743	,, ..	Jeeves, T. ..	14.1.11	18656*	L.-Crpl.	Maywood, F. G.	11.2.11
942*	,, ..	Crozier, W. E. A.	16.1.11	4363	Pte. ..	La Roche, H. ..	21.2.11
1456	,, ..	Hird, F. F. ..	16.1.11	15671	Serjt. ..	Cole, R. W. ..	28.2.11
4469	,, ..	Gilley, E. A. ..	18.1.11	4582	Pte. ..	Ward, R. J. ..	14.3.11
4936	,, ..	Strange, H. E.	18.1.11	5122	,, ..	Slocombe, H. ..	14.3.11
4941	,, ..	Pierce, W. ..	18.1.11	4875	,, ..	Stainton, W. R.	14.3.11
4943	,, ..	Morgan, G. J...	18.1.11	4931	,, ..	Slack, H. ..	14.3.11
4403	,, ..	Privett, B. J. ..	18.1.11	19674	,, ..	Peters, W. J. ..	24.3.11
4960	,, ..	Price, W. A. ..	18.1.11	14761	Crpl. ..	Robertson, W.	27.3.11
4978	,, ..	Williams, J. H.	18.1.11	4411	Pte. ..	Harrold, S. F.	27.3.11
4980	,, ..	Duffell, A. A. ..	18.1.11	5037	,, ..	Sykes, W. J. ..	27.3.11
5035	,, ..	Given, H. J. ..	18.1.11	5043	,, ..	Sigrist, G. ..	27.3.11
4932	,, ..	Moran, W. ..	20.1.11	5091	,, ..	Godfrey, J. ..	27.3.11
19256*	L.-Crpl.	King, W. ..	23.1.11	5093	,, ..	Stallwood, F. E.	27.3.11
1972	Pte. ..	Davidson, B. ..	23.1.11	5022	,, ..	McKeon, M. ..	28.3.11
19234	,, ..	Thurgar, E. ..	28.1.11				

* Reappointed.

ADVANCEMENT OF PRIVATES (CORPS PAY).

The following advancements in rate of Corps Pay will take effect from April 1, 1911:—

To be Advanced to the Third Rate (at 8d.).

As Orderlies.

No.	Name	No.	Name	No.	Name
19170	Jessop, A. G.	19905	Sidebotham, N.	1644	Flavell, C. W.
19509	Mulley, H. F.	86	Redfern, W.	2115	Taylor, A. C.
19546	Joys, A. S.	1617	Eaton, C.		

As Clerks.

19064	Marshall, W. E.	1412	Palmer, W. T.	2147	Hampson, W. C.
925	Lomas, C.	1827	Spratt, T. F.	2205	Lewis, A. R.
1097	Herbert, R.	1905	Eves, J. G.		

To be Advanced to the Fourth Rate (at 6d.).

As Orderlies.

No.	Name	No.	Name	No.	Name
15911	Phillips, C.	2156	Lamb, H.	4344	Sexton, H. W.
19181	Waters, T. A.	2218	Snape, G.	4356	Woodman, R.
19753	Haines, A. H.	2266	Mills, T. S.	4374	Wellburn, J.
1270	Marrable, F. G.	4315	Whitaker, L.	4379	Dunn, J. F.
1798	Gilbert, R. R.	4326	Emslie, P. A.	4402	Hinchcliffe, G. W.
1799	Stowe, S. A.	4330	Morman, H. R.	4403	Privett, B. J.
2084	Titchener, F. S.	4340	Cansfield, A. E.	4474	Rimmer, T.
2152	Armstrong, T.				

As Clerks.

12433	Hughes, C. A. T.	1509	Warren, A.	2211	Sharp, W. E.
19205	Hahner, L.	1772	Butler, M. A.	2278	Gillbee, J.
19267	Peacock, J.	2037	Goulding, B.	4351	Gibson, H. W.
19672	Healey, A. T. J.	2113	Bickers, H.	4695	Boon, H. F. H.
289	Witcombe, R. G.	2145	Cox, W. R. J.	4789	Beatton, H. G.
609	Day, J.	2180	Rogers, T. W. G.	4882	Summers, F. G.

As Cooks

19326	Hewitt, H. W.	1918	Brunton, G. E.	4649	McRoberts, H.
188	Oakley, C.	2102	Catton, F. T.	4672	Templeton, M. R.
274	Conway, P.	4319	Grimley, R.		

SANITARY ORDERLIES (CORPS PAY).

The following Privates are advanced to the Fourth Rate of Corps Pay at 6d., as Sanitary Orderlies, from the dates specified:—

No.	Name	Date	No.	Name	Date
18386	Adye, W. E.	11.11.10	2262	Abercromby, R. H...	14.1.11
19055	Reed, W. R.	28.11.10	1591	Ince, J.	22.1.11
4597	Barker, W.	10.12.10	19350	Barnes, C. J. W. ..	26.1.11
4985	Russell, A.	12.12.10	1521	Palmer, T. A. ..	27.1.11
1630	Riley, E.	18.12.10	19524	Fountain, H. W. ..	30.1.11
249	Scovell, A. H... ..	19.12.10	108	Southwell, J. T. ..	31.1.11
1909	Fowell, J. J.	1.1.11	2180	Wilson, W.	25.2.11
1485	Tipping, J.	12.1.11	2295	Campbell, P. ..	28.2.11
1574	Price, H.	12.1.11	4639	Beesley, F.	1.3.11
19989	Finley, A.	13.1.11	2173	Aitken, T.	3.3.11
867	Grogan, J. M... ..	13.1.11	19730	Young, W. T. ..	16.3.11

BUGLER.

The following boy is appointed Bugler from the date specified:—

No.	Name	Date	No.	Name	Date
4419	Crowther, F.	8.2.11			

TRANSFER SECTIONS.

The following Lance-Corporal is transferred from the "Clerical Section" to the "General Duty Section," at his own request, on probation for the "Nursing Section" from the date specified:—

No. 11592 Callander, A.—21.10.10.

ADVANCEMENT CORPS PAY CANCELLED.

The advancement of No. 1974 Private Ferguson, C.D., to the 4th rate of Corps Pay, as a Cook, notified in Corps Order 37 of 1910, is hereby cancelled, this man having transferred to the "Nursing Section."

DETAILS PROCEEDING TO AND RETURNING FROM ABROAD.

It is notified for general information that in future details proceeding to and returning from the undermentioned Companies and Detachments abroad will be posted to Depôt Companies as under:—

To "A" COMPANY.—25 Company, Bermuda; 26 Company, Ceylon; 27 Company, South China, and Detachment, North China; 29 Company, Jamaica; 32 Company, Straits Settlements, East Africa, Sierra Leone, and Northern Nigeria.

To "B" COMPANY.—28 Company, Gibraltar; 30 Company, Malta; and 33 Company, Egypt.

To "C" COMPANY.—22, 23, and 24 Companies, South Africa; and 31 Company, Mauritius.

DISCHARGES.

7553	S.-Major ..	Rapson, J. M. ..	1.5.11	To pension.
7385	,, ..	Hill, W. E... ..	4.5.11	,,
7397	,, ..	Ford, H. J... ..	7.5.11	,,
6393	,, ..	Rees, A. R... ..	11.5.11	,,
10590	S.-Serj. ..	Elliott, J. W. ..	2.5.11	Medically unfit.
15610	Serjeant ..	Griggs, T. H. ..	22.4.11	Under Art. 1058 (1) R.W.
8756	Lce.-Serjt.	Humble, J... ..	4.5.11	To pension.
18496	Corporal ..	Emery, W... ..	21.4.11	Medically unfit.
8876	,, ..	Legge, J. H. ..	1.5.11	To pension.
8768	,, ..	Crowther, T. ..	8.5.11	Medically unfit.
12396	Private ..	Drought, W. S. ..	18.4.11	Termination of first period.
4398	,, ..	Dewhurst, H. B. ..	28.4.11	Under Art. 1058 (1) R.W.
5377	,, ..	Marsden, E. ..	29.4.11	Payment of £10.
5427	,, ..	Clowes, R. J. ..	4.5.11	,, ,,

TRANSFERS TO ARMY RESERVE.

18592	Pte.	Toomey, A. J. ..	8.4.11	18632	Pte.	Martin, T. ..	27.4.11
1814	,,	Ayres, W. G. ..	12.4.11	18652	,,	Playle, T. ..	28.4.11
18593	,,	Hughes, L. ..	12.4.11	18653	,,	Flower, F. ..	28.4.11
1815	,,	Markin, H. ..	12 4.11	18671	,,	Thackary, S. ..	30.4.11
1816	,,	Wright, A. ..	13.4.11	4481	,,	Benson, J. ..	1.5.11
18600	L.-Cpl.	Grimsdall, F. ..	15.4.11	1821	,,	Turney, E. ..	3.5.11
18685	Pte.	Bunting, W. H.	16.4.11	18693	,,	Williams, R. ..	6.5.11
19033	,,	Fisher, F. ..	22.4.11	18743	L.-Cpl.	Worrad, H. ..	7 5.11
18626	,,	Forde, S. ..	22.4.11	18686	Pte.	Rann, J. ..	7.5.11
18624	,,	Ellis, J.	21.4.11	18701	,,	Lawrence, C. H.	8.5.11
1820	,,	Falconer, H. ..	24.4.11	19036	,,	Gibbons, W. ..	10.5.11

TRANSFERS TO OTHER CORPS.

17973	Serjeant ..	Knott, F.	21.4.11	To Colonial Government.
19253	,, ..	Wilson, C.	4.5.11	To Territorial Forces.

TRANSFERS FROM OTHER CORPS.

9651	Qmr. Serj.	Birch, E.	2.5.11	From Supy. Duke of York's R.M. School.
12322	Serjeant ..	Webster, W. ..	10.4.11	,, Northern Nigeria.
5353	Private ..	Harris, J.	10.3.11	,, R. Inns. Fusiliers.
5369	,, ..	Macfie, T. G. ..	15.3.11	,, Rifle Brigade.
5375	,, ..	Barwick, J. H. ..	9.3.11	,, 1st Btn. R. Fusiliers.
5376	,, ..	Esworthy, L. St. J.	17.3.11	,, Essex Regt.
5440	,, ..	Price, J. R... ..	4.4.11	,, 1st Btn. E. Yorks Regt.
5452	,, ..	Griffiths, H. ..	1.4.11	,, ,, ,, Welsh Regt.
5470	,, ..	Goreham, W. A. ..	29.4.11	,, 2nd ,, Essex Regt.

DEATH.

11402	Serjeant ..	Stokes, E.	20.4.11	At Parkhurst.

THE FOLLOWING N.C.O.'S AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS.

FOR QUARTERMASTER-SERJEANT.

11530	S.-Serj. ..	Starkie, J. T.	16115	S.-Serj. ..	Dewberry, E. B.
11862	,, ..	Rose, H. W.	10296	,, ..	Bangert, H. A.
10106	,, ..	Gooding, E.			

FOR STAFF-SERJEANT.

11896	Serjeant ..	Pell, A. E.	17849	Serjeant ..	Blanks, C. C.

FOR SERJEANT.

12987	Serjeant ..	Walter, B.	45	Corporal..	Moffatt, T. G.
10425	Corporal ..	Tollafield, A.			

FOR CORPORAL.

249	Private ..	Scovell, A. H.	19821	Private ..	Young, B. L.
1591	,, ..	Ince, G.	19824	,, ..	Worrell, C. H.
19289	,, ..	Mills, F. J.			

APPOINTED BUGLERS.

1838	Pte.	Taylor, G. C. J.	6.4.11	5024	Boy	Ballan, D. J. ..	9.5.11
4727	Boy	Conway, J. T. ..	9.5.11				

SPECIAL RESERVE OF OFFICERS.

ROYAL ARMY MEDICAL CORPS.

Lieutenant George Rollason is seconded for service under the Colonial Office, dated January 4, 1911.

The undermentioned to be Lieutenants (on probation): Leonard Whitaker Owen Taylor, M.B., dated March 17, 1911; John Herbert Cecil Grene, dated March 28, 1911; Cadet-Serjeant Percival Thomas Priestly, from the Birmingham University Contingent, Officers Training Corps, dated March 30, 1911; Gilbert Kennedy Awbery, dated March 31, 1911; Cadet-Serjeant Henry Hilton Brown, from the Edinburgh University Contingent, Officers Training Corps, dated April 1, 1911; Reginald Fisher, dated April 29, 1911; Harold Fitz Vellacott, dated April 24, 1911.

TERRITORIAL FORCE.

ROYAL FIELD ARTILLERY.

3rd East Anglian (Howitzer) Brigade, Royal Field Artillery.—Surgeon-Captain Richard W. Mullock resigns his commission, dated May 6, 1911.

ROYAL ARMY MEDICAL CORPS.

1st Home Counties Field Ambulance, Royal Army Medical Corps.—Thomas Henry Peyton, to be Lieutenant, dated March 3, 1911.

3rd North Midland Field Ambulance, Royal Army Medical Corps.—Transport Officer and Honorary Lieutenant Bertram J. T. Ford, resigns his commission, dated May 6, 1911.

Officers attached to other Units.

Captain William Gray, M.D., resigns his commission, dated May 6, 1911.

David Dickie, M.B., F.R.C.S.Edin., to be Lieutenant, dated March 31, 1911.

TERRITORIAL FORCE RESERVE.

ROYAL ARMY MEDICAL CORPS.

Surgeon-Captain Arthur John Helm Montague, from the 8th Battalion, The Sherwood Foresters (Nottinghamshire and Derbyshire Regiment), to be Captain, with precedence as in the Territorial Force, dated May 6, 1911.

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

The following ladies have received appointments as Staff Nurse: Miss A. M. Ahern, Miss E. Dearberg.

Postings and Transfers.—Sisters: Miss E. C. Humphreys, to Cambridge Hospital, Aldershot, from York; Miss E. H. Hordley, to York, from Cambridge Hospital, Aldershot; Miss M. Davis, to Cambridge Hospital, Aldershot, from Egypt; Miss A. A. Wilson, to Tidworth, on return from South Africa; Miss M. C. E. Newman, to Cosham, from Gibraltar. Staff Nurses: Miss A. H. Esden, to Tidworth, from Woolwich; Miss G. F. V. Temperley, to Devonport, from London; Miss L. A. Burgess, to Gibraltar, from Devonport; Miss E. R. Collins, to Egypt, from Tidworth; Miss G. H. C. Paynter, to Curragh, from Devonport; Miss G. H. Sellar, to Cairo, on arrival in Egypt; Miss K. F. G. Skinner, to Cairo, on arrival in Egypt; Miss M. Barton, to Alexandria, from Cairo; Miss M. German, to Alexandria, from Cairo.

Appointments Confirmed.—Staff Nurses: Miss M. C. Corbishley, Miss G. L. Bentley, Miss B. Jackson, Miss D. C. Isaacson.

PRIZE DISTRIBUTION, ROYAL ARMY MEDICAL COLLEGE, LONDON.

THE half-yearly distribution of prizes to the Lieutenants on Probation, Royal Army Medical Corps, and Indian Medical Service, took place in the Lecture Theatre of the College, at 4 p.m., on April 28.

The Commandant, Colonel E. J. E. Risk, read a report on the Session of the Junior Class, and called upon the Director-General, Army Medical Service, to distribute the prizes. The following is a list of the prize-winners.—

Lieutenant A. R. S. Alexander, I.M.S. . Parkes Memorial, 1st Hygiene, Bronze Medal.

Lieutenant C. M. Finny, R.A.M.C.: Tulloch Memorial, Pathology, Silver Medal.

Lieutenant J. Scott, I.M.S.; Fayrer Memorial, Pathology, Bronze Medal and Book.

Lieutenant A. R. S. Alexander, I.M.S.: Ranald Martin, Tropical Medicine, Gold Medal.

Lieutenant A. R. S. Alexander, I.M.S.: Marshall Webb, Military Medical Administration, Bronze Medal, and cheque £6.

Lieutenant K. G. Pandalai, I.M.S.: Second Montefiore, 2nd Military Surgery, cheque £7.

Lieutenant A. R. S. Alexander, I.M.S.: First Montefiore, First Military Surgery, Bronze Medal, and cheque £21.

Lieutenant W. A. Frost, R.A.M.C.: De Chaumont, Second Hygiene, Books bound (two).

Lieutenant A. R. S. Alexander, I.M.S.: Herbert, Highest aggregate, cheque (about £20).

After handing the prizes to the successful candidates, Surgeon-General Gubbins addressed them as follows:—

"Colonel Risk and Gentlemen,—Following the precedent of last session when Lord Haldane distributed the prizes, we had hoped—out of compliment to a sister service—to secure the attendance of the Secretary of State for India on the present occasion, but the Earl of Crewe is abroad recuperating from his recent illness, and Lord Morley, who is acting for him, finds himself unable, to his very great regret, to be present.

"The report we have just listened to from the Commandant is highly satisfactory, and I must congratulate those Lieutenants on probation, especially Mr. Alexander, who have obtained prizes in the various subjects: it is an earnest of success hereafter.

"I would now like to say a few words in connection with your future career.

"Your next stage will be to proceed to Aldershot, where an interesting course of instruction awaits you, which includes amongst other subjects, interior economy, riding, and gymnastics. At the end of two months—about July 1 next—the Royal Army Medical Corps officers will remain on for training in special subjects, whilst you, gentlemen, of the Indian Service, will be granted leave pending embarkation for the East. On arrival you will be sent direct to four centres for a month's instruction in Indian sanitation, and other matters peculiar to that country: these stations are Poona, Bangalore, Lucknow, and Rawal Pindi; at the last three there are Royal Army Medical Corps Messes, of which you will be made honorary members. On the conclusion of the course you will be posted to regiments, if possible in the civil areas which you have selected, when you will have the advantage of association with one of the finest bodies of officers in the world, and opportunities of forming friendships that will stand you in good stead in after life. As time goes on you will cast your eyes about and consider whether you will take up the military or civil side of the profession; each has its advantages and attractions, but much depends on individual temperament and inclination. In the civil branch, although the proverbial Pagoda tree is no longer shaken to the extent it used to be in the days of Clive and Wellesley still there are many lucrative and varied appointments in addition to that of Civil Surgeon open to you, such as Assay Master of the Mint, Sanitary Commissionerships of Provinces, Professorships at the various colleges, Superintendents of Asylums and Jails. The last-mentioned institutions afford an admirable field for learning administration. In these the superintendent combines the duties of governor and medical officer, with great advantage to the State both in the interests of economy and efficiency; it is a system that might well be adopted in this country, and no doubt it will come some day. I can only add that the Service you are about to join is one having grand traditions; it has been adorned in the past by men who would have shed lustre on any calling, and has probably done more than any department of Government towards extending and popularising our rule in India, and in this I am sure my friend on the right (Surgeon-General Branfoot) will cordially agree.

"As regards officers of the British Service, when you have finished your Aldershot course about the end of July you will be distributed to various commands, and may have the good fortune to go on manœuvres and see a little of camp life. After about two years at home you will be drafted to India and the Colonies. As the great majority will be detailed to the former command, the same procedure as regards a month's instruction at the four centres will be followed, as in the case of the medical officers of the Indian Service already alluded to.

"I have sometimes heard it asked 'Where is the necessity for Army surgeons, why cannot the work be just as well done by civilians?' The obvious reply is, an army is maintained for the defence of the Empire, and, notwithstanding all the talk of arbitration, peace, &c., the army will probably last our time. For this army trained officers are essential—primarily, to deal with the sick and wounded in war, and, secondly, to maintain that army in health during peace by preventive measures, and also to treat both officers, men, and their families during sickness. I also wish to impress on you that when you come to be placed in charge of troops and their families, you should give them, especially in illness, of your best; bear in mind that the wife and child of the humblest private is just as much entitled to your skill and attention as the Colonel or the Brigadier. I would also advise you to see active service whenever you get the chance. That great and practical soldier, Viscount Wolseley, when addressing, a few years ago, the Woolwich cadets at a presentation of prizes, told them that 'if they wanted to get on in the Army they should take every opportunity of getting shot,' thereby shocking a good many of the fond mothers and sisters who were

present; however, the Field Marshal was right, and his theory was well exemplified in his own person, but there is this difference between that occasion and the present one, that whereas he was addressing a man-slaying audience I am speaking to a life-saving one. However, the principle is the same; as I have already stated the primary object of your existence is to mitigate the horrors of war, and distinction in the field is the surest road to substantive promotion.

"Having moralised on the business side, I would like to say a few words on the social aspect of your career. As it will be exclusively a military one, I would strongly advise you to cultivate intercourse with officers of every branch of the Service; join in their sports and pursuits; above all, as long as you remain bachelors, at those places where there are no messes of your own, join regimental messes as honorary members; you will always be welcome and do not get into that abominable habit of 'pigging it' (I can give it no other name) in rooms or bungalows. Live what is known as the Army life; if you are not prepared to do so, you might just as well have remained civilians and taken up a practice in say the Black country with all its attendant dullness and discomforts.

"And now I come to another matter which I approach with a certain amount of diffidence, and that is the somewhat thorny subject of matrimony, and with your permission I will act for the time being as it were *in loco parentis*. I also desire it to be understood that the few words I am about to address are meant for the Royal Army Medical Corps officers—for two reasons; in the first place, under existing regulations they join the Army as single men, and secondly as long as they are on the active list they remain under the jurisdiction of the War Office.

"I have been informed that there is an increasing tendency for young gentlemen whilst still lieutenants, that is with less than three years' service, to enter into the married state, and that a good deal of hardship is entailed whenever a change of station is involved. Now matrimony is all very well for the civilian who has, it may be, a fat rectory, a good practice or a prosperous business in the City to step into, but in the Army it is altogether another matter. There are constant moves in the ordinary routine, houses have to be broken up, furniture bought in a dear and sold in a cheap market—often at the shortest notice. Then comes foreign service, it may be in bad climates with the inevitable separation, so that unless the couple, however brave they may be, are possessed of ample private means, their position becomes—to say the least—unenviable. Now in saying all this I do not wish it to be inferred for a moment that I am speaking from the crusty old bachelor point of view; far from it. Marriage is one of the two oldest institutions in this world of ours, and I hope I may live to see every bachelor officer in this room happily wedded when the proper time arrives and when his prospects warrant his doing so, but I would urge on you to ponder well—at all events in the early years of your service—before taking a step which has such an important bearing on your future life.

"I will now take you on a step further. We will suppose the happy time has come, and that amidst the good wishes and congratulations of your friends, accompanied by heaps of presents, you have entered on wedded life. There is an idea prevalent that if a young officer marries, his widow is entitled to a pension—even if he dies within three months of their union. Now this is altogether erroneous; no officer's widow is eligible for a pension unless the husband has had ten years' service. Well, the first piece of advice I can give you is to become a Member of the 'Army Medical Officers' Widows and Orphans Fund,' the advantages of which will, no doubt, be explained to you by the Commandant; but I might mention, incidentally, that the funds at present amount to the large sum of £132,000, and are growing yearly. Again, as a good proportion of you will eventually find your way to India, I would urge you to join the British Military Widows Fund, which was founded as far back as 1824, and is intended to help the widows of officers who may lose their lives in that country; the subscription is small—four rupees a month for a field officer, three for lower ranks and the advantages are great. As Chairman of the Benevolent Society, many sad cases come to my notice which ought never to exist had officers shown a little ordinary prudence—and, shall I say it—a little less selfishness in making provision for their families.

"There is also one other point I would like to mention, and that is, never try to escape a disagreeable station or duty on the score of being married: nothing, believe me, would lower you more in the esteem of either your superior or brother officers. On many occasions when I held high administrative appointments abroad, I have had letters from well-meaning or interested friends somewhat in the following strain—'My dear Gubbins, just a line to say that Lieutenant Jack Seymour, R.A.M.C. (as we will call him for the nonce), goes to your Command next trooping season; he has just

married such a charming girl, and I want you to post him to the hills, or as near them as possible on arrival. It would be a monstrous pity if they were to start their married life in some grilling station in the plains '—and so on. Well, I need hardly say that epistles of this kind had no influence whatever, and, as far as I know, never will. Where duty is concerned, no difference is ever made between the married and the single officer.

"Now, gentlemen, in conclusion, I can only express the hope that you will receive these few words of advice in the spirit in which they are meant; they are the result of the experience of nearly thirty-eight years—very happy years I may add—spent in the British Army. If I have spoken frankly, and somewhat unconventionally, I have done so from a sense of responsibility, and because I have your best interests at heart. You are about to join two splendid Services—each with its own particular attractions and advantages. Whether you succeed or fail will entirely depend on yourselves, but if you set *duty*—duty without any compromise or hesitation—before everything, I have no fear of the result."

Surgeon-General Branfoot and Lieutenant-Colonel Melville having respectively proposed and seconded a vote of thanks to the Director-General for presiding, the proceedings came to a close.

Subsequently Colonel Risk and the officers, R.A.M.C., were "at home" in the mess to a large number of their friends, including many ladies.

ROYAL ARMY MEDICAL COLLEGE.

Examination of Captains for Promotion to Major.

State Medicine.—Special subject. (First written.) Thursday, April 27, 1911. From 2.30 p.m. to 5.30 p.m.

[N.B.—When an officer considers that, in order to answer a question fully he requires more information than is given by the examiner, he may make any reasonable assumption, underlining the same.]

(1) The possibility of water-borne epidemics is still one of the most important dangers which a sanitary officer may expect to have to combat with an army in the field. Discuss the lines on which it has been attempted to prevent these in the past, the position at present, and detail in what direction, in your opinion, success will be obtained in the future.

The principles of the various methods should be given and the reason of their failure or success pointed out.

(2) In barracks capable of accommodating a brigade of Infantry and a brigade of Artillery and details (total 5,000 men, 200 women, and 500 children), you are required to advise on a system of sewage disposal. Write a memorandum giving your appreciation of the situation, and also full details of the installation you would recommend, with your reasons for your selection. What difficulties would you anticipate, and how would you meet them?

Government property extends for half a mile from the barrack limits in the direction of the flow of the sewage, and there is a fall of 80 feet in this distance.

The allowances of water as laid down by King's Regulations (para. 1,037)—Men, 20 gallons; women, 20 gallons; children, 10 gallons; horses, 20 gallons.

State Medicine.—(Second written.) Friday, April 28, 1911. From 10 a.m. to 1 p.m.

[N.B.—When a candidate considers that in order to answer a question he requires more information than that given by the examiner, he may make any reasonable assumption, underlining the same.]

(1) You are Sanitary Officer of a mixed force consisting of an Infantry brigade, a brigade of Field Artillery, and two squadrons of Cavalry, operating in a temperate climate. Water is scarce and obtainable from open source only. Draft orders for—

(*a*) The regulation of water supply in standing camp, dealing with collection, distribution and purification, and

(*b*) For the preservation of water discipline on the march.

The total strength, including details, is 6,000 officers and men, and 1,890 horses.

(2) What are the duties of the Sanitary Officer in respect to billeting? Taking an agricultural area or country town with which you are acquainted, describe in detail

how you would set about these duties supposing yourself to be the Sanitary Officer of a Division about to be billeted therein. The orders defining the billeting area are received by the Divisional Headquarters at 4 a.m. in the morning at the previous halting place, about 15 miles away, and the Division marches out of camp at 9 a.m.

(3) To what articles of diet have outbreaks of "food poisoning" been traced? How would you distinguish between the "bacterial" and "toxic" form of such disease?

(4) What is meant by the term "carrier cases"? How would you classify them? What are the more important epidemic diseases in which the existence of carriers has been proved?

(5) In what diseases has occasional spread of infection been attributed to conveyance by flies? What experimental evidence has been obtained as to the possibility of the spread of infection by these insects? What administrative directions would you give with the purpose of minimising any danger from this source, say, for example, in Cavalry barracks?

Practical State Medicine.—First Day. Thursday, April 27, 1911. From 10 a.m. to 1 p.m.

Give an opinion on the sample of water before you on the Report Form on your desk.

The water has been collected from a stream running through villages and cultivated land. It is proposed to occupy some fields near the stream, for a fortnight, for training a brigade of Infantry. As no other water supply which would suffice for the brigade is at hand, what do you think as to the advisability of occupying the chosen camp?

Second Day. Friday, April 28, 1911. From 2.30 to 5.30 p.m.

(1) Continue the examination of the water put up bacteriologically yesterday.

(2) The sample of butter (?) before you was supplied for the use of the sick in hospital. What is your opinion on it, and what are your reasons for that opinion?

(3) The acid solution has been made up by your laboratory attendant and you propose to make it "Normal." Give its present reaction, and describe how you would proceed to make it "Normal." Leave it on your desk for confirmation by the Examiners.

Bacteriology.—Special subject. Written Examination. Thursday, April 27, 1911. From 2.30 to 5.30 p.m.

(1) Give a concise classification of the principal genera of the Sporozoa and a description of the developmental cycle of Coccidium cuniculi (oviform).

(2) Discuss the various methods of procedure which would be open to you in establishing the identity of a member of the Typho-coli group of organisms.

(3) Describe the technique employed in the bacteriological diagnosis of Cholera, and discuss briefly the chief difficulties that may be encountered.

(4) Briefly review and discuss the value of the various laboratory methods employed in the diagnosis of Syphilis.

Bacteriology.—Special subject. Practical Examination. First Day. Thursday, April 27, 1911. From 10 a.m. to 1 p.m.

(1) You are required to identify the organisms present in Mixture "A." The peptone-agar plate culture "B" has been inoculated with a dilution of "A," and incubated aerobically for twenty-four hours. Proceed to identify the organisms in "B," and carry out any further examination of "A" that you consider necessary, setting aside your cultures for incubation and examination to-morrow.

(2) Stain the paraffin section marked with your number and report in your paper on the nature of the tissue and on the presence or absence of bacteria. Leave your specimen for examination.

(3) Stain the unfixed film marked with your number so as to demonstrate any bacterial or protozoal organisms that may be present in it, and describe in your paper the results of your examination. Label your film and leave it beside your microscope.

Second Day. Friday, April 28, 1911. From 10 a.m. to 1 p.m.

(1) Complete your examination of Mixture "A" and write an account of the steps you have taken and their results. Leave stained films of the organisms beside your microscope.

(2) Stain the unfixed film marked "S" so as to demonstrate the Spirochæta pallida, and leave it in focus under your immersion lens.

(3) Examine carefully the three stained films with which you are provided and describe in your paper what you have found.

(4) Oral examination.

Physical Training, Work, Food, Clothing, and Equipment of the Soldier.—Special subject (written). Wednesday, April 26, 1911. From 10 a.m. to 1 p.m.

NOTE.—Only four questions are to be answered. Nos. 4 and 5 must be answered.

(1) Discuss the movements during a complete double pace of (*a*) the legs, (*b*) the hips, and (*c*) the shoulders.

(2) What, in your opinion, is the total weight that an Infantry soldier should carry on service? Give the reasons on which your reply is based. Assuming that his necessary clothing (exclusive of greatcoat) and armament (including ammunition) weigh 35 lb., how would you allot the weight still remaining at your disposal?

(3) State generally your opinion on the course of physical training through which you have been put. If you were given a free hand, in what direction would you modify it, either by elimination or extension of existing exercises, or addition of new ones? State your reasons.

(4) Discuss the muscular mechanism of respiration, and the physiological means by which it is regulated.

(5) Discuss the respective parts played by protein, fat, and carbohydrate in metabolism in man. How, in your opinion, do these different foodstuffs compare as sources of energy, in the case of a soldier on service?

(6) Discuss the scientific principles underlying the question of clothing. Consider the application of these to the actual supply of clothing to the soldier under varying conditions of temperature, moisture, and work.

Ophthalmology.—Special subject (written). Friday, April 28, 1911. From 2.30 to 5.30 p.m.

(1) In the case of a splinter in the eye from a shell, discuss the injuries to the various structures, the methods of examination, and the treatment.

(2) Describe the changes which may occur in the eye in the case of granular contracted kidney. What is the prognosis?

(3) What are the causes, symptoms and treatment of paralysis of the third nerve.

(4) What are the various operative measures that might be adopted in a case of neglected iritis?

Dermatology and Venereal Diseases.—Special subject. (Written.) Thursday, April 27, 1911. From 2.30 to 4.30 p.m.

(1) Give an account of the affections of the various organs that may arise in a congenitally syphilitic subject. Indicate the approximate ages at which these troubles may be expected.

(2) Give a short description of the various forms of tuberculosis of the skin.

(3) Give a short description of the rashes liable to arise from the ingestion of iodides and bromides. For what may they be mistaken, and how would you distinguish them?

(4) Describe the following diseases and give the differential diagnosis:—Impetigo contagiosa of the beard, staphylococcic sycosis, tinea barbæ.

Otology, including Rhinology and Laryngology.—Special subject. (Written.) Thursday, April 27, 1911. From 10 a.m. to 1 p.m.

(1) What are the different forms of acute inflammation of the tonsils? Give the signs and symptoms of each form, and state briefly the treatment you would adopt in each form.

(2) What are the causes of chronic laryngitis? What laryngoscopic appearances may it give rise to?

(3) What are the commoner causes of (*a*) bilateral adductor paralysis, and (*b*) bilateral abductor paralysis, in the larynx? What are the laryngoscopic appearances, and what symptoms do these conditions give rise to?

(4) What causes may give rise to a unilateral purulent discharge from the nose? How would you proceed to make the diagnosis?

(5) Give some account of the methods of testing the hearing, and specify the diagnostic value which may attach to any of these methods.

(6) Describe the causes, symptoms, and treatment of acute middle ear suppuration.

Midwifery and Gynæcology.—Special subject. (Written.) Thursday, April 27, 1911. From 1.30 to 5 p.m.

(1) Describe the processes concerned in the involution of the puerperal uterus, and state in what conditions it may be delayed.

(2) In the case of a contracted pelvis having the undermentioned measurements,[1] what mode of treatment would you adopt?

(*a*) Seing the patient for the first time at the sixth month of pregnancy.

(*b*) At full term.

(3) Mention the causes which lead to descent of the cord in labour, and your treatment of this condition when the cervix is dilated to the size of a 2s. piece and when it is three-fourths dilated.

(4) What are the indications for the use of the Curette, what are its dangers and how would you prepare a patient for this operation?

(5) A patient was delivered six weeks ago. She has for the last four weeks suffered from severe pain in the lower abdomen. Her temperature for the last week ranged between 100° F. and 103° F. The belly is swollen and so tender that you can detect nothing more than increased resistance. By vaginal examination you find the cervix in the normal position, and the uterus quite fixed by a hard swelling occupying the posterior half of the pelvis and dipping low down behind the uterus. Discuss the diagnosis and treatment of this case.

(6) Discuss the diagnosis of the following case:—A woman, aged 35, married two years, no children or miscarriages, catamenia regular and at times rather profuse, the last period occurring on March 2. On May 21, after a long walk, she was seized with a sudden attack of acute abdominal pain, slight shivering, and developed some fever. On June 2, a tender swelling could be felt occupying chiefly the right side of the lower abdomen, and extending half-way up to the umbilicus. In the left side of the lower abdomen was a smaller ill-defined swelling. On vaginal examination the os uteri could be felt displaced upwards to the left. Douglas' pouch was filled by a well-defined tumour.

Examination of Lieutenants, Royal Army Medical Corps and Indian Medical Service, at the Close of the First Session, 1911.

Hygiene.—Written examination. Monday, April 24, 1911. From 2.30 p.m. to 5.30 p.m.

(1) In its passage through the earth water takes up certain substances in solution and suspension. Detail the most common of these, and state what you consider the most important (*a*) as indicating the possibility of contamination of the water, and (*b*) as actual, possible causes of disease.

(2) What is the ultimate aim of all methods of sewage disposal? Describe (*a*) a contact bed, and (*b*) a streaming filter. State in what respects they differ from each other in their construction and working. What are the local conditions which would influence you in your choice of one form of installation or the other?

(3) What do you understand by the words "disinfectant," "disinfection," "saturated steam," and "superheated steam"? What are the parts played by these last in the working of a high pressure steam disinfector?

(4) What are the true foods and what rôle do they play in the body? Which of these do you consider the most indispensable and why? Under what circumstances can a food act as a poison, and what bearing has this on the question of the general suitability of certain foodstuffs?

(5) What do you understand by the expression "carrier" in connection with enteric fever? In an outbreak of this disease the general circumstances of disease, incidence, &c., point to three men as being possible carriers. State in detail the bacteriological procedure you would follow with a view of ascertaining the truth or otherwise of this proposition.

Practical Examination. Tuesday, April 25, 1911. From 2.30 p.m. to 5.30 p.m.

(1) Report on the sample of milk as to its fitness or otherwise for issue to patients in hospital. Give reasons, in detail, for your decision.

(2) Graduate the soap solution before you to the usual strength, *i.e.*, so that 1 c.c. is equivalent to 1 milligramme of calcium carbonate, and find the total hardness of the water sample before you.

[1] Dist. Sp., 8¾ inches. Dist. Cr., 10⅝ inches. Ext. Conj., 7 inches. Diag. Conj., 4¼ inches.

Pathology.—Written examination. Saturday, April 22, 1911. From 10 a.m. to 1 p.m.

(1) Describe the principal changes which you would expect to encounter in the blood in the following conditions:—

(*a*) Pernicious anæmia.

(*b*) Ankylostomiasis.

(2) Discuss the experimental evidence which supports the current views as to the mode of infection in bubonic plague.

(3) Give an account of the life history of Filaria bancrofti and mention the principal pathological conditions to which it gives rise.

(4) Describe concisely the cycle of development of the parasite of Quartan Malaria. On what points would you rely for the differential diagnosis of this parasite in a stained film of blood?

Practical examination.—Friday, April 21, 1911. From 10 a.m. to 1 p.m.

(1) Examine the bacterial suspension with which you are provided, and write an account of the chief morphological characteristics of the germs you have found. Leave two films, stained by different methods, beside your microscope, properly labelled.

(2) Stain the unfixed blood film so as to demonstrate the presence of malarial parasites. Mention in your paper the variety of malaria present, and the different forms of the parasite which you have seen. Leave your film for examination.

(3) Stain the material marked "S" for spores, and leave your specimen in focus under your oil-immersion lens.

(4) Oral examination.

Military Surgery.—Saturday, April 22, 1911. From 2.30 p.m. to 5.30 p.m.

(1) The axillary artery and vein are wounded by a small-bore bullet, fired from a medium range. What are likely to be the results of such a wound? Give briefly the symptoms of each condition, and the treatment you would adopt. (30 marks.)

(2) "The Lee-Enfield bullet begins to wobble at about 1,000 yards." What is the meaning of this statement, and how does the fact affect the wounding power of the bullet? (10 marks.)

(3) Describe the types of fracture met with in small-bore gunshots of the shafts of long bones. Mention any peculiarities in (1) the initial symptoms (2) the subsequent clinical course of such injuries, and discuss the advisability or otherwise of immediate exploration. (30 marks.)

(4) Give the nature, signs, complications and treatment of gunshot wounds of the kidney. (30 marks.)

Tropical Medicine.—Monday, April 24, 1911. From 10 a.m. to 1 p.m.

(1) Discuss briefly the effects of exposure to heat on man. In what ways may these effects be modified by the habits or condition of the subject exposed to heat?

(2) Describe the symptoms, differential diagnosis and treatment of cholera.

(3) Mention three tropical diseases in which prolonged (over four weeks) fever of a hectic type may occur. State how you would differentiate between them.

(4) Give the treatment of a case of malignant tertian malaria (*a*) during an access of pernicious symptoms with coma, (*b*) after the pernicious attack has passed off.

Military Medical Administration.—Tuesday, April 25, 1911. From 10 a.m. to 1 p.m.

(1) What are the duties of a medical officer in camps?

(2) How does a soldier report "sick"? Describe the procedure up to his final disposal.

(3) Infectious disease breaks out in barracks. What is the procedure of the medical officer in charge of barracks as to the disposal of cases and disinfection?

(4) A soldier is wounded on service; describe the method of conveyance to the base, enumerating the various establishments he passes through.

(5) What are the component parts of a Division; and of

(i) An Infantry Field Ambulance?

(ii) A Cavalry Field Ambulance?

LIST OF CAPTAINS TO ATTEND THE COURSE AT THE ROYAL ARMY MEDICAL COLLEGE COMMENCING ON NOVEMBER 1, 1911.

Name	Remarks	Name	Remarks
C. G. Thomson	—	J. A. Turnbull	..
A. B. Smallman	—	D. P. Johnstone	—
W. F. Ellis	—	E. H. M. Moore	—
J. W. S. Seccombe ..	India (should come home first ship)	F. J. Garland	—
		R. J. Cahill	—
		S. C. Bowle ..	—
C. V. B. Stanley	Egyptian Sanitary Department	P. Dwyer	—
		H. T. Wilson	..
		R. C. Hallowes	—
G. H. J. Brown	—	G. A. D. Harvey	—
T. E. Harty	—	E. J. H. Luxmoore ..	—
D. P. Watson	—	M. Sinclair .. .	—
F. M. M. Ommanney ..	—	A. N. Fraser	—
G. A. Kempthorne ..	—	H. St. M. Carter	..
N. E. Dunkerton	—	K. A. C. Doig	—
H. C. Hildreth	—	P. A. Lloyd-Jones ..	—
R. T. Collins	—	J. St. A. Maughan ..	—
A. C. Osburn	—	L. V. Thurston	..
L. Bousfield	—	J. P. Lynch	..
J. H. Douglass	—	E. G. R. Lithgow ..	—
A. S. Arthur	—	J. S. Pascoe	—
R. R. Lewis	—	G. H. Richard	—
A. L. Otway . ..	—	W. McConaghy	—
C. H. Turner	..	A. A. Sutcliff	—
F. H. Noke..	—	H. E. Gotelee	—
W. F. H. Vaughan ..	—	E. J. Elliott	—
G. E. Cathcart	..	J. H. Gurley	—
Waiting.			
A. W. Gater	—	W. G. Maydon	—
E. B. Booth	—	J. E. Powell	—
R. K. White	..	G. Ormrod	—

ROYAL ARMY MEDICAL CORPS WARRANT OFFICERS' AND SERJEANTS' (PAST AND PRESENT) ANNUAL DINNER CLUB.

Members.

Messrs. G. P. Robertson,* G. Fowler, A. Fowler, Furness, Gent,* Buckland, Towers,* Phillips, Shaw,* Heading,* G. W. S. Bush,* Dawson,* Davis, Quarrington,* Neilan, H. Barton,* C. A. Barton,* Godbolt, W. H. Taylor,* Slater, Gibbs,* Genese,* Delany,* Coad, Atkins, Wall, Collins, Godwin, J. Davies, Humphreys, Norfolk, Mallord,* Gatesman,* Burridge, Ball, Caufield, Main, Lattemore, Forth, Hampton,* Sargeant, Rourke,* Marsden,* W. A. Browne,* Harvey, Webb, Wright, Bellati,* Rampton, Tempest, Harrington, James, Lovett, O'Connor, Rothery,* Hallowell,* Beater, Hart, Singleton,* Burrell, Rannie, Turner, Perrin, Paxman,* Smellie, Spring, Rand,* Brina, Perkins,* Wakefield, Elcombe,* Evenden,* F. Jackson, Harris, Grogan, Bowen, Benson, Forman,* Martin, Huxtable,* Stacey, Steel, E. F. Robertson, Lawrence,* Griffiths, H. M. Bruce, Shannon, Hannahan, Price, Hayward, Patten,* Mitchel, T. Jackson, Driver, Wales, Lorraine, Higgins, Musslewhite, W. J. Bush,* H. H. Taylor,* Reynolds, Legg, Kenshole, McEvoy, Curtayne, Gledhill, Spary, Warrick,* Riding, Saunders, Lander,* A. Audus, Goodman,* Bellingham,* Hinton,* Westfield,* Fitchett, R. T. Browne,* Ravenshoe,* Barratt,* W. H. Smith,* Evans,*

Power,* Digby-Scammell, Lockwood,* Crampton,* Hart, Porter,* Powell,* Nye. Lieutenants Saunders, Wilson,* Clark,* Newland, McColgin and Smith. Sergeant-Majors Spencer,* Cooper,* Downing, Conway, Buckley,* Green,* Bollen,* How,* Godman,* Henfrey, J. F. Ford, H. J. Ford, Ritchie, Packard, Clark, Hew,* Roberts,* Carey, Woollard,* E. E. Ward,* F. J. Taylor,* Eate, Grenfell,* Giddings, Stanley,* Stevens, Senior, Edser, Brennan, Todd,* Houston, Tilbrook,* Cross, W. A. Taylor, Wilson, Tillbury, Figg,* Barnard, Renton, G. J. Smith,* Huntingford, Wickersham.* Quartermaster-Serjeants.—Audus,* Arnold,* Birch,* Bray,* Baynes,* Cox,* Coggan, Cassell, Connolly,* Darke,* Duff,* Fitch, Flemming,* Genese, Hurrell,* Hicks,* Hook,* Horn, Holden, Kingston,* Larner, Muggleton,* Powell, Piercey,* Polhill, Storey, Strong, Taylor,* Tite, Walker,* Yeates, Underwood. Staff-Serjeants.—Argents,* Audus, Andrews, Bright, A. Baker,* Baxter,* Bird,* A. Bush, T. Connolly,* Clement, Cardwell, Chudleigh, B. D. Conolly,* Cornell, Caseley, W. Cox,* Clegg, Cotter, Clilverd, Dyer,* Easey, French,* Fletcher, Fraser, Granger, Gibbons,* Gordon, Harris,* Hunt,* Hubbard, Holmes,* Howell, Janes,* Johnson, Kerstein, Landon, Lovegrove, Loft,* Le Poidevin, Leaf, S. C. Morris, McClelland, Merredith,* Merchant,* Maxwell,* G. R. Morris, Medwell, Mulley, McKay, Parton, Perritt,* Pritchard, Pitchforth, Pack, Page,* Pettley,* Rose, Raven, Ryan,* Rayer, Shaw,* Squire,* H. Steele,* Sallis,* Sprinks, Sage,* Spencer, Thuillier,* Tunn, Townend, Willsher* Wilkins. W. J. Wilson,* Ward, Waller, C. B. Willsher, Williams,* Way,* West,* Watt,* Young, Enwright.* Serjeants.—Anderton, Ashton, Avery, Bottomley, F. B. Barratt,* Blanks, Burrows,* Barnes,* Bowen,* Black, A. E. Barrett, Burgess, Buckner, Boulton, Butler, E. G. W. Barnes, Court,* Chettleburgh, Clenshaw, Dean,* Dunn,* M. Davies, A. J. Davis, Dell,* Dewar,* Daintree,* Dixon,* Dady,* Dent,* Ebbs,* Evans,* Folkes, Fowler, Griffiths, George, Gregory, Goodread, Gamblin, Gregson, Gillespie, Godfrey, Glenn,* Godden,* Grant,* W. C. Hughes, Humble, F. Hughes, Horn, G. T. Holmes, Hopwood, Harper, Harrold, Howe,* H. Harlen, C. H. Hart,* Heggie,* Hill, Hinde, Hurst, Howell,* Jordon, Jewell, James, C. Jones, W. Jones, Knightly, Knott,* Kirby, Kerr, Lake,* Levey, Leggatt,* MCarthy, Musgrove, Muirhead,* Metherill,* Malley, Munden, Mallan,* McDonald, Moore,* Macklen, March,* Miller,* Neenan,* Ogden, Oldridge, Pegg, Parson,* G. W. Palmer,* Pottinger, Pugh, Parker, Payne, Parr, Primer, Pursey, Partridge,* Pickup,* Philbrook,* R. G. J. H. Palmer, Robson, C. Steele, Ross,* Russell,* Robinson,* Skinner, Sproule,* Simes, Snowdon, Senior, Shaw, Suter,* Sharp, G. T. Smith,* Thomas, Tindall, Thompson,* Valance,* Virgo,* Vickers,* T. R. Wilson, Webberley,* Wales, Worswick, Wheston,* R. Wilson, C. Wilson, Wrigglesworth, Winn.* Corporal-Majors Carroll and O'Flynn* (Life Guards).

The asterisk against name signifies present at dinner.

The third dinner of the Club was held in the "Pillar Hall" Victoria Station Restaurant, S.W., on Wednesday, April 19.

Dinner was served punctually at 7.30 p.m., and long before that time was reached the number assembling indicated that the gathering would prove a large one. Two hundred and nine sat down to a very good dinner in the best of spirits, for during the intervening hour many a long-standing friendship, many an old comradeship, had been revived or cemented.

The Chair was taken by the President, Surgeon-General W. L. Gubbins, C.B., M.V.O., K.H.S., M.B., Director General, A.M.S.

The Guests of the Club were, Surgeon-General W. Babtie, V.C., C.M.G., M.B., Lieutenant-Colonels G. D. Hunter, D.S.O., and E. M. Wilson, C.B. C.M.G., D.S.O., Majors W. H. Horrocks, M.B., and G. B. Stanistreet, M.B.

The other officers present were:—Colonels C. E. Harrison, M.B., A. Peterkin, M.B., E. J. E. Risk and W. G. Birrell, M.B. Lieutenant-Colonels T. B. Winter, J. Maher, M. W. Russell, N. C. Ferguson, C.M.G., M.B., C. H. Burtchaell, M.B., A. R. Aldridge, M.B., E. Eckersley, M.B., Sir W. B. Leishman, F.R.S., M.B. and A. P. Blenkinsop. Majors B. H. Scott, S. Guise Moores, T. W. Gibbard, M.B., T. P. Jones, M.B., C. W. Profeit, M.B., C. E. Pollock, E. T. F. Birrell, M.B., J. B. Short and A. Bruce. Captains F. S. Irvine, M.B., N. D. Walker, M.B., C. H. Straton, J. S. Bostock, M.B., T. E. Harty, and R. R. Lewis. Lieutenants R. R. Cowan, J. Wilson and J. Clark.

As in the preceding year a strong contingent of the Corps Band, under the conductorship of Mr. Robertson, the Bandmaster, rendered an excellent account of a splendid programme and contributed in no small measure to the successful evening.

Amongst the many members present we had again the pleasure of seeing Mr. H. H. Taylor from Dunblane, and two of our members from Ireland (Serjeant-Major Buckley and Staff-Serjeant Connolly) also had travelled over for the occasion. Serjeant-Major Ward and Quartermaster-Serjeant Bray came up from Devonport, as also did Staff-

Serjeant Wilson and Serjeant Dent from Netley, and Serjeant-Major Stanley from Bulford, thus East, West, South, North, were duly represented.

The dinner having been successfully negotiated amid a ceaseless flow of reminiscences and the toast of "The King" having been duly honoured, the President of the Committee (Serjeant-Major Green) in a few graceful words proposed the toast of "The Chair."

The Chairman, Surgeon-General Gubbins, in reply, congratulated the Club on its increased membership, and thought it might now safely be considered a permanent institution. He was glad to be able to announce that promotion to commissioned rank had at length reached normal. He also paid a tribute to the character and services of those Quartermasters who had retired during the past twelve months. He was much gratified by the success of the various teams which competed at the Cookery Exhibition held at the Horticultural Hall in October last, the judges having recorded their opinion that the Royal Army Medical Corps Cooking had reached a very high standard. Another pleasing announcement he was able to make was the selection of one of their cooks (Serjeant Palmer) to be Chef at the Duke of York's School—a post for which there were many candidates.

In conclusion, he desired to express the great pleasure he felt at being called on to preside for the third year in succession, and to thank Serjeant-Major Green and the members present for the kind manner in which they had received the toast of his health.

After a brief interval the health of "Our Guests," was proposed by Mr. Mallord, coupled with the names of Colonels Peterkin and Risk.

Both these Officers in a few sympathetic words replied on behalf of the guests.

The Chairman then called upon the Honorary Secretary to propose the health of "Our Absent Members."

The Hon. Secretary rising said :—

Mr. Chairman and Gentlemen,—Or rather may I say for one sweet moment, "Comrades All"; I do not know why I have been chosen to propose the toast to our absent members. I suppose it is on account of my peculiar, lugubrious, and pathetic countenance. The toast is the one touch of sadness in an otherwise hilarious meeting. The seas separate us from some of our comrades. Alas! The skies others. There are three sorts of absentees—those voluntarily absent, those absent through duty (more power to them), and those who have crossed the river Styx. Of the first, I can only say the loss is theirs. Of the second, we respect their absence. As regards the third, those who have gone, I will simply quote from Dr. Oliver Wendell Holmes :—

"When we have done with our life-lasting toys,
Dear Father, take care of Thy children, the boys,"

and members of our Corps need have no fear of the inevitable if we only try, always, to do our duty to the best of our ability.

I now ask you to rise and drink the health of our absent members, coupled with the hope that they may be allowed to be present at our next gathering.

A General Meeting of the Club was held in the Serjeants' Mess, Millbank, S.W., on Saturday, May 18, for the purpose of auditing the accounts for the past year, to elect officers for the ensuing year, and to transact such other business as might present itself.

There were present: Messrs. Bush (G.W.S.), Hallowell, Gateman, Taylor (W. H.), Towers, Mallord and Porter. Serjeant-Majors Spencer, Cooper, Green and How. Quartermaster-Serjeants Cox, Walker, Fleming, and Kingston. Staff-Serjeants Sage and Gibbons.

The accounts (audited by Serjeant-Major Cooper and Quartermaster-Serjeant Kingston) showing a balance cash in hand of £13 3s. 8d., and found correct, were duly read, passed and confirmed.

The following officers were elected or re-elected to carry on the work of the Club for the ensuing year :—

Hon. Treasurers.
Major G. B. Stanistreet, M.B., Serjeant-Major S. How.

Honorary Secretary.
Mr. H. Porter, 12, Cotford Road, Thornton Heath.

President of Committee.
Serjeant-Major F. J. Bollen.

Members of Committee.

Mr. A. Mallord.
Quartermaster-Serjeant R. Cox.
Mr. J. Genese.
Quartermaster-Serjeant G. B. Walker.
Mr. G. W. S. Bush.
Staff-Serjeant J. Sage.

STATEMENT OF ACCOUNTS.

Receipts.	£	s.	d.	Expenditure.	£	s.	d.
By balance, cash brought forward from last year (1909-1910)	13	1	6½	To 102 Copies of Corps News, May, 1910, for Circulation	0	17	0
,, Cash from 102 New Members (Entrance Fees) ..	5	2	0	,, Printing, Stationery, &c., including Menu Cards ..	4	16	5
,, Cash from 287 Members for Subscriptions.. ..	14	7	0	,, Postage Account	3	3	5½
,, Cash for Dinner Tickets sold..	37	16	0	,, Gratuity, Railway Fares, Supper and Refreshments, R.A.M.C. Band	5	2	5
				,, Cost of Dinner, including Gratuities to Waiters ..	43	3	7
				,, Cash in hand	13	3	8
	£70	6	6½		£70	6	6½
Balance Cr.	13	3	8*				

* Exclusive of outstanding subscriptions, for year ended April 19, 1911, £8 6s.

Audited and found correct.
C. H. COOPER, *Serjeant-Major, R.A.M.C.*
C. KINGSTON, *Quartermaster-Serjeant, R.A.M.C.*

G. B. STANISTREET, *Major, R.A.M.C.*,
STANLEY HOW, *Serjeant-Major, R.A.M.C.*, } *Treasurers.*

THE INTERNATIONAL HYGIENE EXHIBITION, DRESDEN.

This exhibition was formally opened by the King of Saxony in the presence of a large assembly of delegates representing the official and scientific world of Germany and foreign countries. The exhibition covers practically every aspect of hygiene and the underlying idea is to bring home to the masses the various causes of ill-health and disease, and the best way to combat these.

The English pavilion, which has been erected by private subscription, will be ready early in June; most of the other National pavilions were completed and ready for inspection on the opening day.

The section of tropical diseases prepared by the School of Tropical Medicine, Hamburg, is excellent and well worth a visit. The life history of all known parasites is fully shown by models, diagrams and microscopic preparations.

In the Army and Navy section the German naval and field medical equipments are on view. The arrangement of permanent and improvised railway trains and barges is shown by a number of excellent models.

Any of our officers who care to combine a little study with their leave would find a visit to the exhibition most instructive. Dresden is a pleasant city and easily reached.

In addition to the exhibition there is a celebrated picture gallery, and the surroundings of the city are extremely picturesque.

ACTUARY'S REPORT ON THE VALUATION OF THE LIABILITIES OF THE ARMY MEDICAL OFFICERS' WIDOWS AND ORPHANS FUND, AS AT DECEMBER 31, 1910.

50, REGENT STREET,
LONDON, W.,
1st May, 1911.

To the Committee of Management of the Army Medical Officers' Widows and Orphans Fund.

GENTLEMEN—In accordance with your instructions, I have made a valuation, as at December 31, 1910, of the assets and liabilities of your Fund for the statutory quinquennial return to the Registrar of Friendly Societies, and for the information of your Members.

The data supplied by your Secretary have enabled me to make a thorough detailed investigation into the affairs of the Society, and my valuation shows that its financial position continues to be eminently satisfactory, and that the Fund is administered economically and efficiently, with due regard to the best interests of the members and to the purposes for which it was originally established.

In the Table appended to this Report the changes in the several classes of members during the past five years are clearly set out, and it is most gratifying to observe a substantial accession of new members.

During the quinquennium, 1900-1905, the number of members declined from 215 to 187 (including 76 annuitants), but, during the past five years, the number of members has increased from 187 to 221 (including 75 annuitants). There were, therefore, 146 subscribing members on your list at the end of the past quinquennium, against 111 at the end of the previous quinquennium. I have no doubt that this improvement in numbers is due to appreciation of the revision of the rules in 1905, when orphan annuity benefits for all members were added to the widows' annuity benefits already granted by the Society, and also to the fact that many officers of the Service have realised that they can obtain from the Fund, at least a minimum provision for their widows and orphans at a much lower cost than from any Life Assurance Company or other Society.

Only rough estimates of mortality experience can be made from such small numbers, but I gather from the statistics:—

(1) That the mortality experience of married members has been lighter than in the past quinquennium, and well within the rate expected by the Tables used in the valuation.

(2) That the number of deaths of annuitants has been 14, against 10 in the previous quinquennium, and out of practically the same number exposed to risk.

(3) That the number of deaths of members' wives was 3, against 5 in the previous quinquennium, and somewhat below the number expected.

On the whole, the mortality experience of the past five years has been favourable to the Society.

In calculating the reserves for the annuities, immediate and contingent, I have employed the mortality tables adopted at the previous valuation, namely: "The British Offices Life Annuity Tables," as they appear to reflect the experience of the Society more closely than other standard tables.

Of the unmarried members on the books during the five years, six married, and one married member, who became a widower, re-married. These figures show much the same marriage experience as in the previous quinquennium, and are roughly consistent with the results which might have been expected according to the tables adopted in this and the previous valuation for valuing risks involving probabilities of marriage.

No orphan benefits have arisen during the quinquennium.

I have, as on the previous occasion, adopted 3 per cent per annum as the valuation rate of interest.

The average rate of interest realised on the funds during the five years was £3 13s. 8d. per cent per annum, and the difference between the assumed valuation rate of 3 per cent and this effective rate provides (after crediting interest to the Management Fund) a substantial contribution to the surplus of the Society.

In this connection, it occurs to me to suggest that, as a means of increasing the interest profit of the future, it would be well to take into consideration the following suggestions:—

(1) That the present deposit of £22,083 13s. 6d. with the National Debt Commissioners, at a rate yielding only £3 0s. 10d. per cent. per annum, should be withdrawn and invested in first-class securities, within your powers of investment, to yield at least 3½ per cent. per annum.

(2) That in order to widen your powers of investment, Rule XXXV. should be revised to include any investment in which trustees are for the time being by law authorised to invest trust funds.

On December 31 last, the Benefit Fund amounted to £130,175 5s. 4d., and the Management Fund to £4 019 9s. 3d. making the total funds £134,194 14s. 7d., after writing down all marketable securities to their market value on the date of the balance-sheet, the amount of the depreciation, £1,433 14s. 4d., being shown in the revenue account for last year.

At the last valuation a Management Fund was set aside, out of the General Fund, representing the present value of 6 per cent. of the annual subscriptions then receivable, and of annuities then payable. On this occasion a reserve of £5,877 has been made, on the same principle, for future expenditure, and the present Management Fund being £4,019 9s. 3d., the difference of £1,857 10s. 9d. representing the increased reserve must be transferred from the Benefit Fund to the Management Fund in the accounts for the current year.

You will observe that, for the first time, I have inserted in the valuation balance-sheet a reserve for unhealthy climate and war risks. The extra expenditure incurred by the Society, in consequence of the exposure of some of the members in the course of their professional duties to these extra risks, has hitherto been met out of the balance of the general surplus Fund.

Although it is difficult to make any precise actuarial measurement of the extra liability involved, I have, from my experience of such matters, made a rough estimate of the same, and would suggest that, on this occasion, the sum of £5,000 should be set aside as a special reserve for these risks.

In this connection, I would point out the desirability of revising Rule V. in order to give the Committee power to make a special extra charge to an officer who, at the time of applying for membership, has any immediate prospect of incurring the risks of war, or of any other extra-hazardous service; and also authorising the Committee to close the Fund to new subscribers when war is imminent, if they think it desirable.

The results of the valuation of the assets and liabilities of the Fund are shown in the following Valuation Balance Sheet:—

ARMY MEDICAL OFFICERS' WIDOWS AND ORPHANS FUND.

Valuation Balance Sheet, as at December 31, 1910.

Dr.	£	s.	d.	*Cr.*	£	s.	d.
To present value of Immediate Annuities to 75 Widows	36,420	0	0	By Amount of Funds ..	134,194	0	0
,, Present value of Contingent Annuities to the Widows (or Orphans) of Married Members..	41,512	0	0	,, Value of future Subscriptions of Married Members	19,333	0	0
,, Present value of Contingent Annuities to the future Wives (or future Orphans) of Unmarried Members ..	542	0	0	,, Value of Subscriptions of Unmarried Members who entered before January 1, 1906 ..	146	0	0
,, Reserve for Unhealthy Climate and War Risks	5,000	0	0				
,, Reserve for Management Expenses ..	5,877	0	0				
,, Net Surplus	64,322	0	0				
Total ..	£153,673	0	0	Total	£153,673	0	0

The surplus of £64,322, disclosed by the above balance sheet, includes the balance of £58,397 carried forward from the last quinquennial valuation, when the sum of

£5,993 was, under the Rule X., appropriated to members out of the then ascertained surplus, and applied in increasing the widows' benefits and providing orphan annuity benefits.

With reference to the application of Rule X. on this occasion, I would suggest that, out of the present surplus, the sum of £8,815 be appropriated for division, which will provide—

(1) An addition of 4 per cent. to all annuity benefits, immediate or contingent, in respect of members *on the books on December* 31, 1910, which will bring the £50 annuity benefits up to the present statutory limit of £52 per annum.

(2) A sum of £100 to be paid at the death of every first-class married member on the books at December 31, 1910, should he pre-decease his present wife, and to be in addition to the sum then payable as the first half-yearly annuity payment.

(3) To the widow of each second-class married member on the books at December 31, 1910, a sum of £50 to be paid at the death of the member, should he pre-decease his present wife, and to be in addition to the sum then payable as the first half-yearly annuity payment.

This appropriation will leave a balance of £55,507 to be carried forward as the General Surplus Fund to the next valuation.

Yours faithfully,

H. W. ANDRAS,

Fellow of the Institute of Actuaries.

(Any information regarding this Society can be obtained from the Secretary, Captain J. T. Clapham, 20, Belgrave Road, S.W.)

UNITED SERVICES MEDICAL SOCIETY.

THE next meeting of the above-named Society will be held at the Royal Army Medical College, Grosvenor Road, S.W., on Wednesday, June 14, 1911, at 5 p.m., when a paper will be read by Major C. F. Wanhill, R.A.M.C., on "Water Supply in the Field."

ANNUAL DINNER.

THE Annual Dinner of the officers of the Royal Army Medical Corps will take place on Monday, June 12, 1911, in the "Picture Rooms," Princes' Restaurant, Piccadilly, W., at 8 o'clock precisely. President, the Director-General.

The price of dinner tickets to subscribers will be 7s. 6d., and to non-subscribers £1 12s. 6d.

It is particularly requested that applications for tickets, both by subscribers and non-subscribers, should be made as early as possible, in order that the number attending may be approximately known. Non-subscribers when applying for the tickets should forward the sum of £1 12s. 6d. by cheque or P.O.O., made payable to the Honorary Secretary. From subscribers the price of the dinner ticket will be collected at Princes' Restaurant on the night of the dinner.

The following officers will be regarded as subscribers :—

(1) All existing subscribers to the old Royal Army Medical Corps Dinner Fund, provided that they have paid their subscriptions to that Fund for this year.

(2) All subscribers to the Royal Army Medical Corps Fund,[1] provided that their subscriptions are credited to the Fund before the date of the dinner.

Selected instrumentalists from the Royal Army Medical Corps Band, Aldershot, will play during dinner.

A plan of the tables will be on view at the restaurant on the day of the dinner, in order that officers desirous of doing so may select the places at which they wish to sit.

[1] Any officers who may have specially excluded the Annual Dinner in the allocation of their subscription will of course be excepted.

N.B.—It is notified that the Monday in Ascot week has been retained as the day on which the dinner will be held each year.

Miniature medals will be worn.

E. T. F. Birrell, Major, R.A.M.C.,
Hon. Secretary.

12, *Sutherland House,*
Chesniston Gardens,
Kensington, W.

THE ROYAL SCHOOL FOR DAUGHTERS OF OFFICERS OF THE ARMY, LANSDOWN, BATH, JUNE, 1911.

Your votes and interest are solicited on behalf of Shelagh Clare Colpoys Ward, aged 10, daughter of Surgeon-Major E. C. R. Ward, F.R.C.S.I., and the youngest of six children. Surgeon-Major Ward had sixteen years' service in the Army Medical Staff when he was obliged to retire on account of loss of sight. He became totally blind, and died eighteen months ago. He was through the Zulu, Sekukuni, and Boer Wars, and was present and wounded in the action of Bronkers' Spruit, in the Transvaal, in which action 150 out of the 250 were killed or wounded, and six out of eight officers lost. Surgeon-Major Ward, with 100 wounded, remained prisoners in the hands of the Boers for three months, and it was to the hardships, privations, and anxieties of this period that the failure of his health was due, which resulted in his loss of sight. The case is recommended by: Surgeon-General W. L. Gubbins, C.B., M.V.O., M.B., K.H.S., Director-General, Army Medical Service; Surgeon-General Sir William Taylor, K.C.B., M.D., K.H.P.; Surgeon-General Sir Alfred Keogh, K.C.B.; Surgeon-General Sir Charles M. D. Cuffe, K.C.B., F.R.C.S.; Major-General Sir George A. French, K.C.M.G.; Colonel R. A. Kerr Montgomery, D.S.O., R.A.

BIRTHS.

JACKSON.—April 20, 1911, at Green Royd, Brighouse, Yorks, the wife of Major R. W. H. Jackson, of a daughter.

HOAR.—On May 20, at Belfast, to Captain and Mrs. J. E. Hoar, R.A.M.C., a daughter.

DEATHS.

HEATHER.—On April 12, 1911, Lieutenant-Colonel David Campbell Williamson Heather, retired, late Army Medical Staff, aged 67. He entered the service on October 1, 1867, as an Assistant Surgeon (Staff); became Surgeon, Army Medical Department, on March 1, 1873; Surgeon-Major, October 1, 1879; Surgeon-Lieutenant-Colonel, Army Medical Staff, October 1, 1873, and retired on retired pay with the honorary rank of Brigade-Surgeon on January 25, 1888. His war service was: Ashanti War, 1873-74; medal. South African War, 1879. Zulu Campaign.

LIGERTWOOD.—At Chelsea, on May 10, Surgeon Thomas Ligertwood, C.B., M.D., retired, Medical Department. He entered the service as an Acting Assistant Surgeon on October 20, 1851; became Assistant Surgeon, 40th Regiment, November 14, 1851; Surgeon, second class, (Staff), February 8, 1856; Surgeon, 13th Foot, December 18, 1860; transferred to the Staff, October 29, 1861; 61st Foot, December 31, 1861; 4th Hussars, July 29, 1862; 8th Hussars, June 25, 1867; and was transferred to the non-effective list on appointment as Deputy-Surgeon, Royal Hospital, Chelsea, January 13, 1869. He was appointed Physician and Surgeon (with the local rank of Surgeon-Colonel whilst so employed) June 8, 1896, and retired on retired pay on June 8, 1904. His war service was: Crimean Campaign, 1854-56: affair of

Bulganac, battles of Alma (mentioned in Despatches) and Inkerman (slightly wounded); capture of Balaklava; sortie of October 26, 1854; and assault on the Redan, June 18, 1855. Medal with three clasps; Knight of the Legion of Honour; Turkish medal.

McCUTCHAN. — At London, on April 18, Lieutenant-Colonel James Shaw McCutchan, M.B., retired, late Army Medical Staff, aged 66. He entered the service as an Assistant Surgeon, Staff, on March 31, 1866; served also in the 4th Foot; became Surgeon, Army Medical Department on March 1, 1873; Surgeon-Major, March 31, 1878; Surgeon-Lieutenant-Colonel on March 31, 1886, and retired on retired pay on July 4, 1891.

MACKIE.—At Aberdeen, on April 18, 1911, Honorary Brigade-Surgeon David Mackie, M.D., retired, late Army Medical Department. He entered the Service on October 1, 1862, as Assistant Surgeon (Staff); became Surgeon, Army Medical Department, March 1, 1873; Surgeon-Major, April 28, 1876; and retired on retired pay with the honorary rank of Brigade-Surgeon, October 1, 1882.

EXCHANGES, &c.

The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, Serle Street, London, W.C., not later than the 22nd of the month.

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A free issue of twenty-five excerpts will be made to contributors of all articles classified under the heading of Original Communications, Lectures, Travels, and Proceedings of the United Services Medical Society.

Any demand for excerpts, additional to the above, or for reprints, must be forwarded at the time of submission of the article for publication, and will be charged for at the following rates, and additional copies at proportionate rates:—

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	8	0 9 0	0 4 4				
	16	0 16 9	0 6 9				
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Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notified at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Captain W. R. P. Goodwin, Major C. T. Green, R.A.M.C. (T), Colonel J. S. Harwood, Dr. A. Balfour, Colonel R. H. Forman, Captain J. A. Turnbull, Lieutenant-Colonel Gordon Hall, Captain J. A. Balck, Major J. W. H. Houghton.

The following publications have been received:—

British: The Indian Medical Gazette, The Australasian Medical Gazette, Journal of the United Service Institution of India, The Lancet, Army and Navy Gazette, Guy's Hospital Gazette, The Middlesex Hospital Journal, The Cavalry Journal, The Royal Engineers Journal, Journal of the Royal Sanitary Institute, The Practitioner, Medical Press and Circular, The Hospital, The Medical Review, Public Health, Proceedings of the Royal Society of Medicine, The Shield, St. Bartholomew's Hospital Journal, Red Cross and Ambulance News, The Journal of Tropical Medicine and Hygiene, Journal of the Royal Institute of Public Health, Aldershot Military Society, Sleeping Sickness Bureau, Journal of the Royal United Service Institution, Annual Report on the Public Health of Gibraltar.

Foreign: El problema de la Tuberculosis en la Vida Militar, Rivista de Sanidad Militar, United States Naval Medical Bulletin, Archives de Médecine et de Pharmacie Militaires, Archives de Médecine et Pharmacie Navales, Wiener Medizinische Wochenschrift, Archiv. für Schiffs- und Tropen-Hygiene, Giornale di Medicinæ Militare, The Military Surgeon, Deutsche Militärärztliche Zeitschrift, Le Caducée, Russian Naval Medical Journal, Archives de L'Institut Pasteur de Tunis, The Philippine Journal of Science, Bulletin of the Johns Hopkins Hospital, Office International D'Hygiene Publique, Annali di Medicina Navale e Coloniale, The Cleveland Medical Journal, Japanese Medical Journal, American Medicine.

MANAGER'S NOTICES.

The JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January, but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in April and October of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters notifying change of address, should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and must reach there not later than the 20th of each month for the alteration to be made for the following month's issue.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

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